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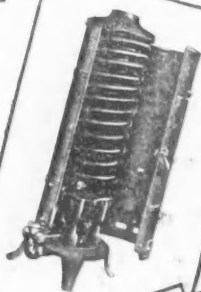
The Architectural Record

August 1916

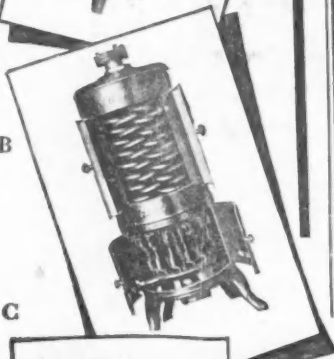


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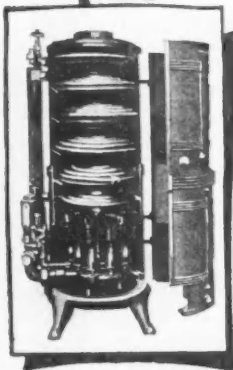
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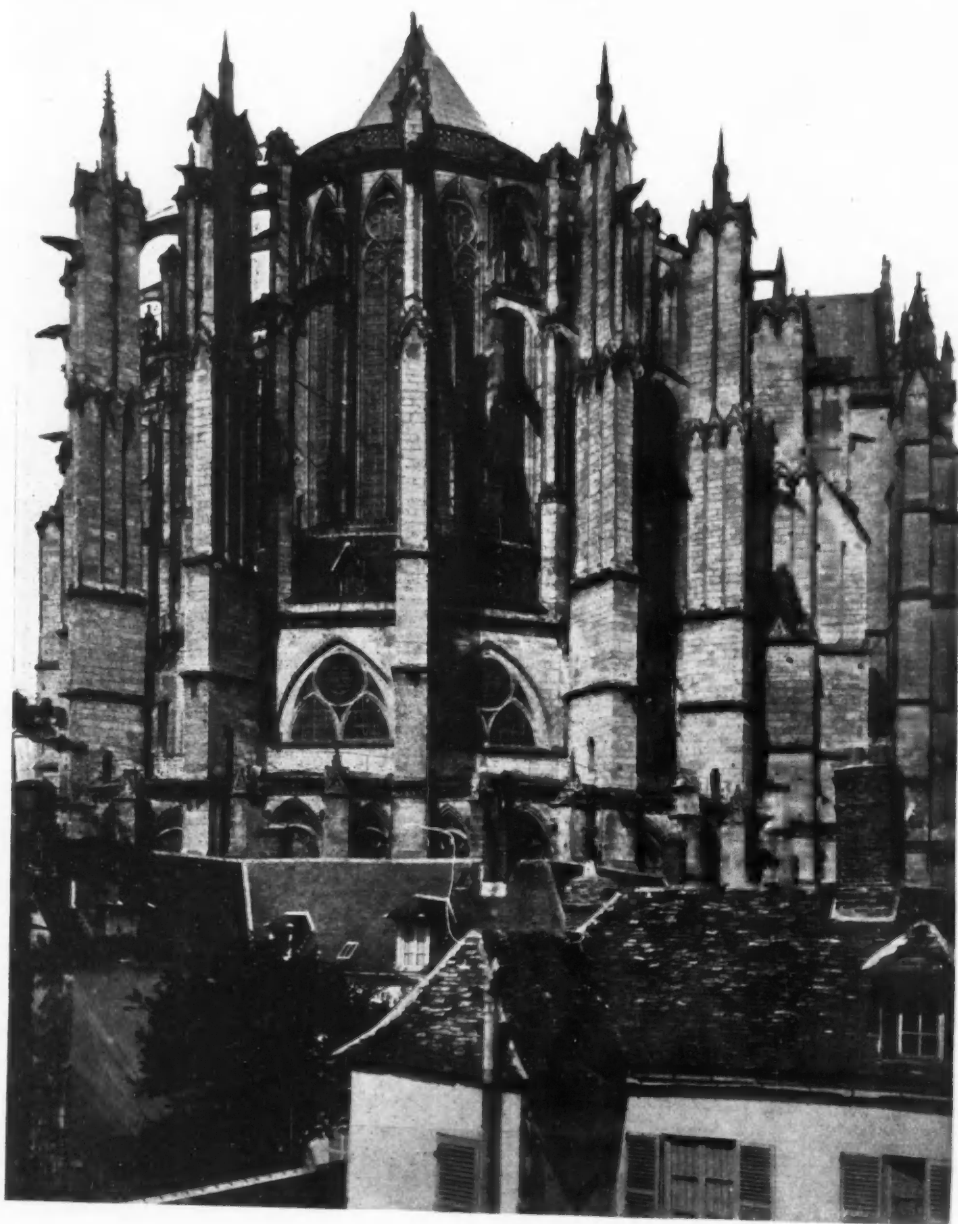


FIG. 1. BEAUVAIS CATHEDRAL, EAST END.

THE ARCHITECTURAL RECORD

VOLUME XL



NUMBER II

AUGUST, 1916

Gothic Architecture and Its Critics *

By
A. D. F. Hamlin

Part III - The Logic of Gothic Architecture

THE late Professor Ware, beloved of architects, was accustomed to observe that the fundamental distinction between the medieval and the classical styles was in their approach to the problem of design. The classic designer was dominated by certain abstract ideals toward which he worked with traditional forms. The medieval designer was dominated by the immediate exigencies of his task, striving not towards an abstract ideal of form but towards the solution of a specific problem. The Roman and Byzantine architectures were intermediate progressive steps from the Greek ideal toward the Gothic evolution of wholly new types in the solution of new problems under new conditions. The logic of necessity overcame the dominance of traditional ideals.

In the so-called Romanesque styles the development of the Catholic ritual and monastic requirements under new con-

ditions, compelled the gradual transformation of the simple three-aisled basilican plan into the elaborate twelfth-century type with spacious transepts, long choir, apse with ambulatory, and chapels opening from this ambulatory and from the eastern side of the transept-arms. At the same time, the exigencies of materials, climate and environment compelled the substitution of massive piers of masonry for the slender classic columns of the traditional basilica type, and of vaults of stone for the wooden ceilings, first of the side-aisles and ultimately of the broad central aisle also. With this transformation the whole traditional apparel of the Roman Christian basilica went by the board—classic capitals and mouldings, marble incrustations, mosaic adornments. Poverty of resources, remoteness from the influence of classic models and from the Byzantine centers of decorative art and the complete sepa-

ration of the Western from the Eastern church, combined to force the Western builders back upon their own powers of original contrivance to meet these new conditions. The Italians of Lombardy, at Milan and Pavia, had developed the earliest forms of the groined ribbed vault along with the clustered pier and the recessed doorway with jamb-shafts and stepped arches, and these new devices were carried by monks from Italy into Germany and France. A new architecture grew into being from these germs; an architecture of heavy masonry of small stones, thick walls, massive vaults and ribs, and piers designed in each case not according to antique traditions but according to the special requirements of each case. The developments were empirical; every sort of vault and every species of membering of arches and shafting was tried, guided by a common-sense structural logic groping for a final solution, and building always on the accumulating experience of previous ventures. The only traditions that long survived were those of the Corinthian capital, the acanthus leaf and—where antique ruins abounded, as in Provence—of the egg-and-dart and other minor ornaments. Sculpture, which the early Christians had held almost in horror, began to show itself in a new symbolism, largely influenced by Byzantine carved ivories, which were in demand even in France, for triptychs, covers for Gospels and the like.

Gothic architecture was the outgrowth of these developments. It dealt with the same problems, but worked out new solutions for them. As was explained in the last paper of this series,* it is characterized by increasing loftiness and lightness of construction and a steady progress toward the elimination of massive walls, the enlargement of the windows, the decoration of its structural members and the use of sculpture and stained glass as a means for religious instruction and inspiration. The dominant features of this architecture were structural, in form and appearance at least, if not always in actual function. The

majority of them, even of those most distinctive of the Gothic style, had their origin in the Romanesque style which preceded it. The pointed arch, the ribbed groined vault, the clustered pier, the grouped pier-arch moldings, the flying-arch and buttress, the spire, are all found in French Romanesque churches. Tracery and the buttress-pinnacle are about the only distinctively Gothic structural features not formed in the preceding style; and one may even claim that these are there in rudimentary form. There is, in reality, no sharp line of demarcation to be drawn between the two styles, for the later style grew gradually, at first imperceptibly out of the earlier. There is not a little reason, therefore, in the suggestion sometimes made that the Romanesque should be called the "round-arched Gothic" style.

Yet after all, the popular distinction between the Romanesque and the Gothic has its justification. Towards the middle of the wonderful twelfth century—the century of the Schoolmen, of Abelard, of Bernard of Clairvaux, of Arnold of Brescia; the century of the rise of cities and of the beginnings of international trade; the century when men's thoughts began to widen and to soar; the century of the First Renaissance;—towards the middle of this century architecture began to feel the working of a new spirit. Notwithstanding the Romanesque substitution of logic in design for the expiring classic tradition, the Romanesque architecture had been hampered by the limitations of the monasticism which had in large measure created it. A new and more daring spirit of progressiveness now began to manifest itself here and there, especially in the north of France, in Normandy, Picardy, Champagne, parts of Burgundy, and above all in the Royal Domain. It found increasing opportunity for expression in the building of new cathedrals, for bishops whose power and wealth and influence with king and people were increasing as that of the rich and oppressive abbots and their monasteries declined. A new freedom appeared in the architecture, in the work

*In *The Architectural Record* for May, 1916: "The Definition of Gothic."



FIG. 2. "A NEW SPIRIT SEEKING NEW DEVICES."
FLYING ARCHES OF CHARTRES CATHEDRAL.



FIG. 3. NAVE OF ROUEN CATHEDRAL.
RIBBED VAULTING AND VAULTING SHAFTS.

of the lay-builders, the free masons, who built the cathedrals, and this new spirit expressed itself in the greater loftiness, lightness and spaciousness of the cathedrals and parish churches. As Sir T. G. Jackson has phrased it in his latest and ripest writing:* "The true way to look at Gothic art is to regard it not as a definite style bound by certain formulas—for it is infinitely various—but rather as the expression of a certain temper, sentiment and spirit which inspired the whole method of doing things during the Middle Ages." The doing of these things he regards as having been controlled by three fundamental principles: solidity—that is, sound and stable construction; economy—that is, the efficient disposition of materials and suppression of unnecessary features; and the esthetic expression of construction. All three principles he traces back through Romanesque and Byzantine to late Roman architecture; but they were progressively developed, and in Gothic architecture they came to their fullest realization. It was a new spirit, constantly seeking new forms, new devices, new ornaments, new proportions, that distinguished the Gothic architecture from all that had gone before. The structural logic of the Romanesque period was guided into new channels; the old tree was made to bear a new and lovelier fruitage.

II.

The *leit motiv* of Viollet-le-Duc's discussions of French Gothic architecture is the word and idea of *logique*. Every essential feature of that architecture was evolved by rigid processes of reasoning applied to the structural necessities of each problem. Every form used was the logical result of these processes. There was obviously also a strong artistic sense ever present to control their reasoning; but the general conclusion from Viollet-le-Duc's discussions is that art was the servant of structural logic, not logic of art.

This raises an important question, fundamental to the criticism of the style.

*"Gothic Architecture in France, England and Italy." Cambridge (Eng.) and Chicago; the University Presses. 1915. 2 vols.

It seems incredible that the superbly artistic beauty of Reims and of Amiens could have been the fruit of cold logic, however intelligent. Construction dominated by pure reason alone is nothing else than pure engineering. If it was logic that shaped the arches and traceries and pinnacles of Reims and Notre Dame, it must surely have been a logic controlled and dominated by a supreme artistic sense; a logic as emphatically esthetic as it was structural. No one can pretend to believe that the men who designed the hundreds of beautiful churches that have made French medieval architecture glorious were mere engineers seeking the most efficient and economical means of piling up their vaulted aisles and providing lofty chambers for their bells. Yet such would be the natural inference from a too emphatic and exclusive insistence on the structural logic of the French builders.

In the articles "Construction," "Contrefort," "Voûte," "Charpente" and others in the *Dictionnaire raisonné*, Viollet-le-Duc takes the French Gothic churches to pieces, analyzes their construction, and shows how each part was shaped for a definite structural function, and how every feature underwent successive changes as increasing experience and new resources or new requirements called for modifications of form or proportion. He developed the idea of the structural function of the vaulting-ribs, first pointed out by Willis in 1842. He was himself the pioneer in setting forth the true history of the buttress and flying-arch, bringing to bear upon it his keen historical sense, and tracing the actual historical sequence of the development of these devices for opposing isolated and concentrated resistances to the isolated concentrated thrusts of the vaults. He emphasized the structural ideas which controlled the development of window-tracery and the forms of towers and spires. From his analysis and presentation of these developments the completed edifice seems to emerge as a piece of glorified engineering. It is empirical engineering, qualitative rather than quantitative in its calculations; building on experience, often of

failure and disaster, but engineering nevertheless, though wrought by builders with an instinctive sense of esthetic values. Even the proportions, according to Viollet-le-Duc, were determined by geometric diagrams. Pure art appears in the carving, sculpture and stained glass only; all the rest was *logic*; it was scientific, calculated, practical construction.

This conception of Gothic architecture has dominated nearly all the critical writing on the subject for the last fifty years, at least in France and the United States. It is the foundation of Professor Moore's *Development and Character of Gothic Architecture*, and is there presented with great force and clearness. The most recent American work on this subject is Professor Frothingham's Volume III of the *Sturgis-Frothingham History of Architecture*.^{*} In the first chapter of this admirable volume we read (p. 9): "The characteristics of Gothic architecture * * * are primarily constructive and secondarily aesthetic. Gothic architects were above all things mathematicians, geometricians. * * * Everything constructively unnecessary was eliminated; every structural element was frankly shown. The science that dictated it was exulted in. The time required to develop Gothic was simply the time during which laboratory experiments were being conducted in the *chantiers* to gradually adapt the forms to the new principles." Professor Moore, in the work cited above and in his *Mediaeval Church Architecture of England*[†] dwells constantly on constructive logic or organic function as the essential determinant of true Gothic architecture. The Early Pointed style of England is not Gothic, in his estimation, because it does not follow the structural logic of the French; it is only "Pointed Norman," Norman with pointed arches. "Indeed," he says, "the use of the pointed arch in the greater part of the architecture of the continent in the twelfth century appears

to have arisen from *aesthetic motives only*,^{*} and is thus unaccompanied by a *proper*^{*} development of that consistent organic system which distinguishes the true Gothic style (p. 45). The piers of Canterbury Choir are not "logical," because they do not express the differing functions of main and subordinate piers under sexpartite vaulting (p. 71). "To use it" (the single round pier) "as Hugh has done * * * is illogical." The words "logic," "logical" and "organic" and their contraries, occur constantly in this book, in criticizing the English imitations of, or departures from, the French practice. I am not here finding fault with the criticisms, but simply calling attention to the point of view of the author.

Here and there, however, a protest has been sounded against this unqualified laudation of pure logic in the French Gothic work. Mr. Ralph Adams Cram has voiced this protest with his characteristic fervor in his *The Heart of Europe*, where he says (pp. 110-111): "Gothic art had three controlling forces working towards an unattainable perfection; structural integrity irradiated by consummate invention and an almost divine creative genius; passion for that exalted beauty that is unchangeable and eternal * * * ; the just balance and interplay of these two forces. Its virtues, like all virtues, were most easily transmuted into vices, once the controlling balance was overthrown, and each was, in its stimulating possibilities, a constant and irresistible temptation toward excess. * * * In Amiens we see the first fatal steps in the development of a purely human (and notably French) logic, toward that intellectual pride, that almost arrogance of self-confidence, that found its Nemesis in the unstable marvel of Beauvais." An anonymous writer whom he quotes speaks of the change in Amiens "from architecture into a very wonderful kind or ornamental engineering;" and Cram himself considers Amiens "one of the most technically perfect and one of the least inspired" of French cathedrals. It is perhaps not surprising to encounter

^{*}"A History of Architecture," Vol. III, "Gothic in Italy, France and Northern Europe." By A. L. Frothingham, late Professor of Archaeology and the History of Art, Princeton University. New York: Doubleday, Page & Company. MCMXV.

[†]New York: The Macmillan Company, 1912.

^{*}The italics are ours.

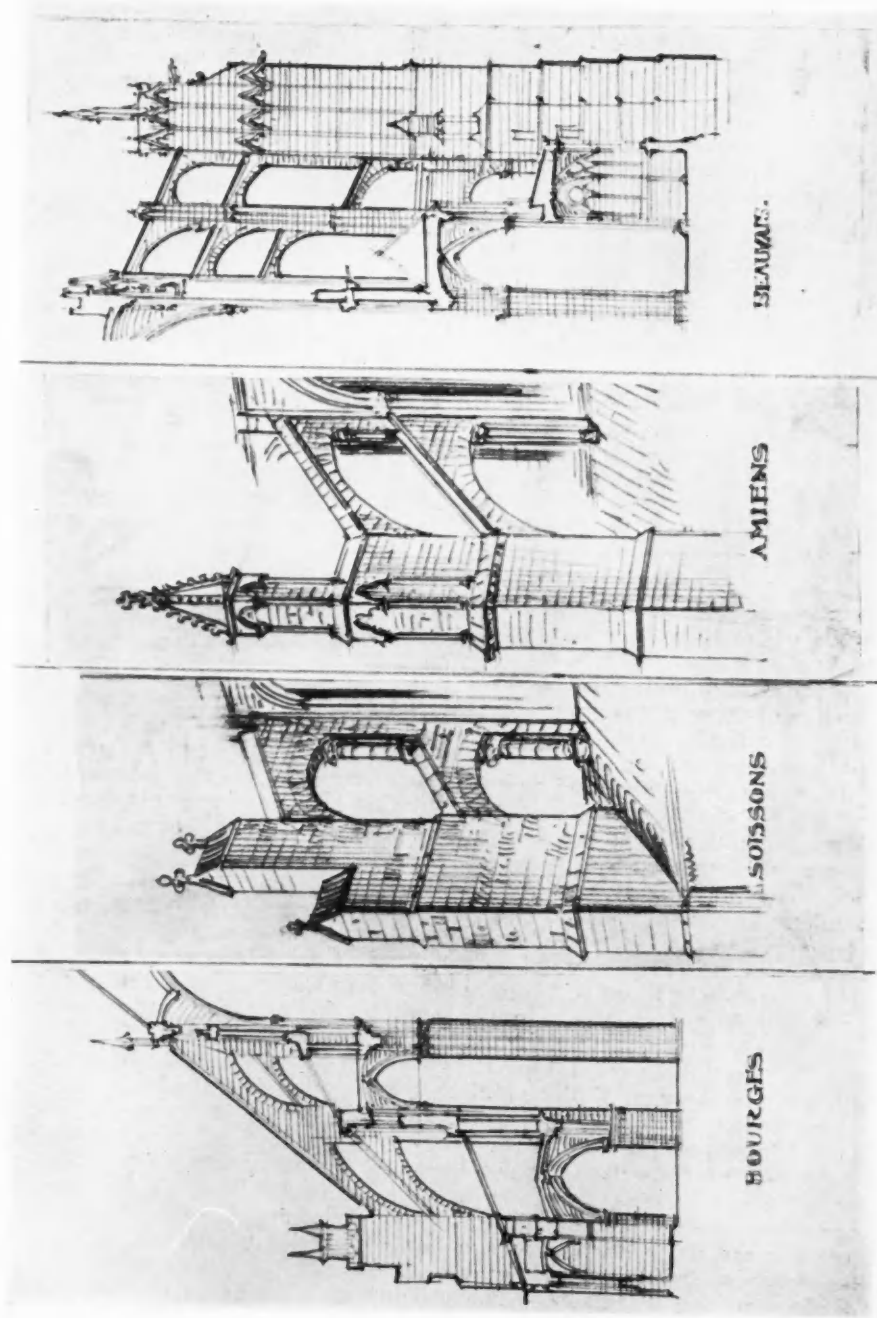


FIG. 4. FRENCH BUTTRESS SYSTEMS.

like judgments in the English writings, for the English taste has always been more strongly inclined towards the imaginative than the coldly logical. "It was the logic of the Parisian," says Prior in his excellent *English Gothic Architecture*, "that brought to his Gothic both its extreme excellence and its decay: the *science* of vault-construction fell in with his bent. The idea having once attracted him, his logical faculty compelled him to follow it to the end. His vaults rose higher and higher; his poise and counterpoise, his linkage of thrust and strain grew more complicated and daring, until material mass disappeared from his design, and his cathedrals were chain-works of articulated stone, pegged to the ground by pinnacles."

The insistence on pure logic, so prevalent in French and American writing, so much less conspicuous in the English literature of the subject, is absolutely lacking in the early writers in English. Ruskin ignores it; Fergusson in his *History of Architecture in All Countries* gives no hint of the evolutionary progress of the French Gothic architecture, nor of the dependence of its development upon the application of scientific reasoning to structural problems. His curious bewitchment by the ethnographic idea prevents any comprehensive treatment of the Romanesque origins, and though he abandons his ethnographic system when he comes to the Gothic buildings, he fails to discover in these any unifying principle except "painted glass, which is really the important formative principle of Gothic architecture." Vaults and buttresses are not discussed till nearly the end of the account of Gothic architecture in France, and construction is disposed of in one and a quarter pages (I, 581-582)—after pinnacles and spires! The vaults he calls "false ceilings," built of stone under the real roof, and considers this construction as bad as the Greek practice of putting marble tiles on a timber roof (I, 449). "The construction of a vault capable of resisting the destructive effects of exposure still remains a problem for modern architects to solve. Until this is accomplished one

must regard roofs entirely of honest wood as preferable to the deceptive stone ceilings which were such favorites in the Middle Ages" (!) (I, 321). Such misapprehensions are not chargeable to the later English writers—Bond, Prior, Simpson and Jackson. Although Mr. Bond is an ecclesiologist and not an architect, he writes understandingly of constructive matters; while the other three reveal the architect's primary interest in the structural logic of the Gothic styles. Our American writers—Sturgis, Moore, Frothingham and Porter, all know their Viollet-le-Duc, their Enlart and their Lefèvre-Pontalis; they show a full appreciation of the French Gothic *logique*, of the structural as well as the artistic elements of their subject. They differ in their estimates of the English and other non-French styles, but Moore is alone among them in denying to the English architecture the merit of a really logical evolution and of conformity to truly Gothic principles.

III.

It would be tedious to undertake a detailed examination and *critique* of these several writers, English and American, as to their treatment of the medieval logic. But it may be interesting to consider in a summary way some of their more commonly repeated contentions on the subject. Let us confine ourselves to the logic of vaults, of buttress-systems, of vaulting shafts, and of structural expression.

It was Robert Willis who first, among writers in English, expounded clearly the genesis and *rationale* of Gothic vaulting, when in 1842 in his *Essay on Vaulting* already mentioned, he gathered together the slowly-matured results of the investigations of others and his own careful examination of a number of English vaults in process of repair or reconstruction. The function of the ribs as a preliminary skeleton or framework upon which the fillings could be easily built; the division of the bays by these ribs into four or more compartments which could be filled in independently of each other; the differing functions of the main ribs—for which he used the

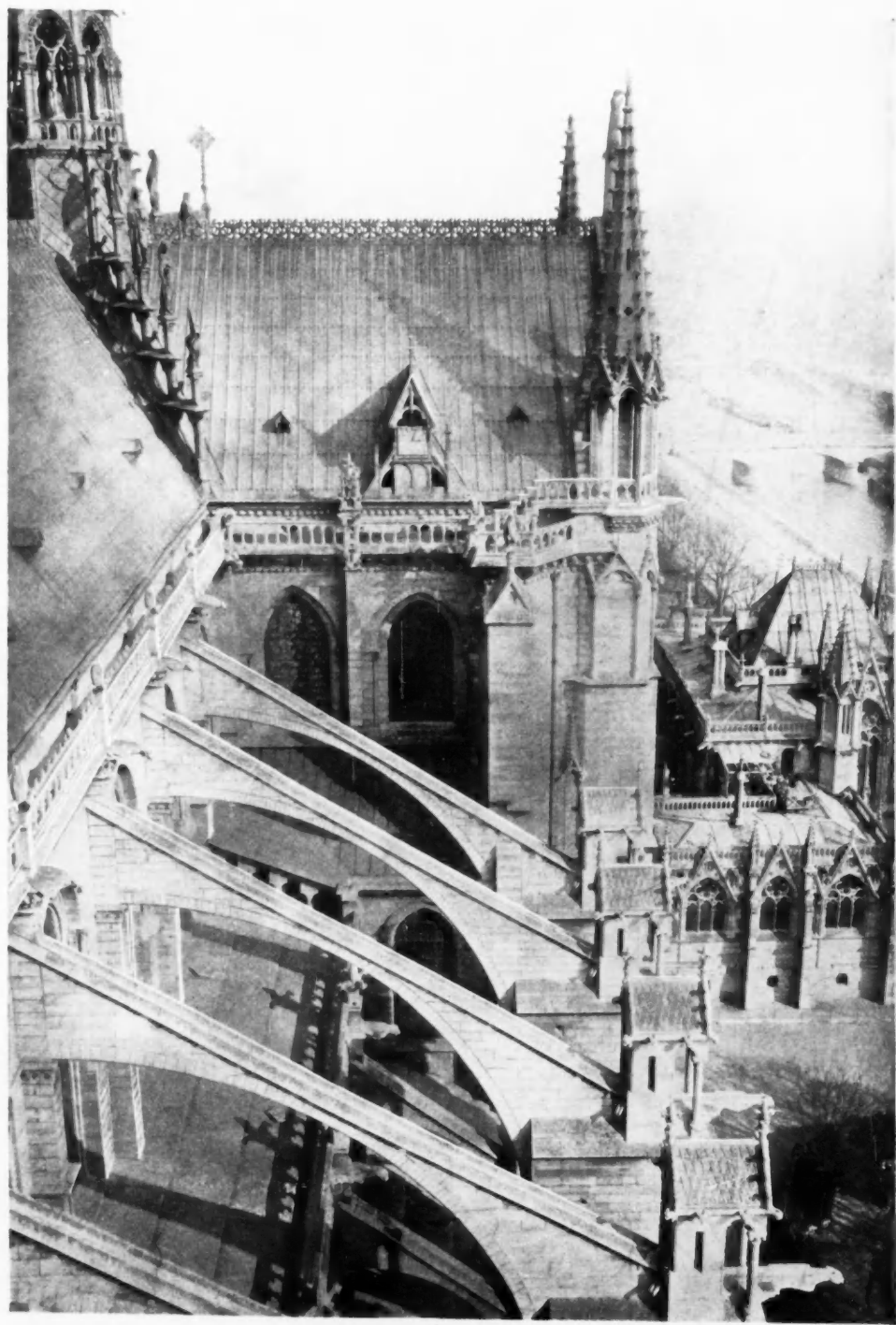


FIG. 5. FLYING ARCHES
OF NOTRE DAME, PARIS.

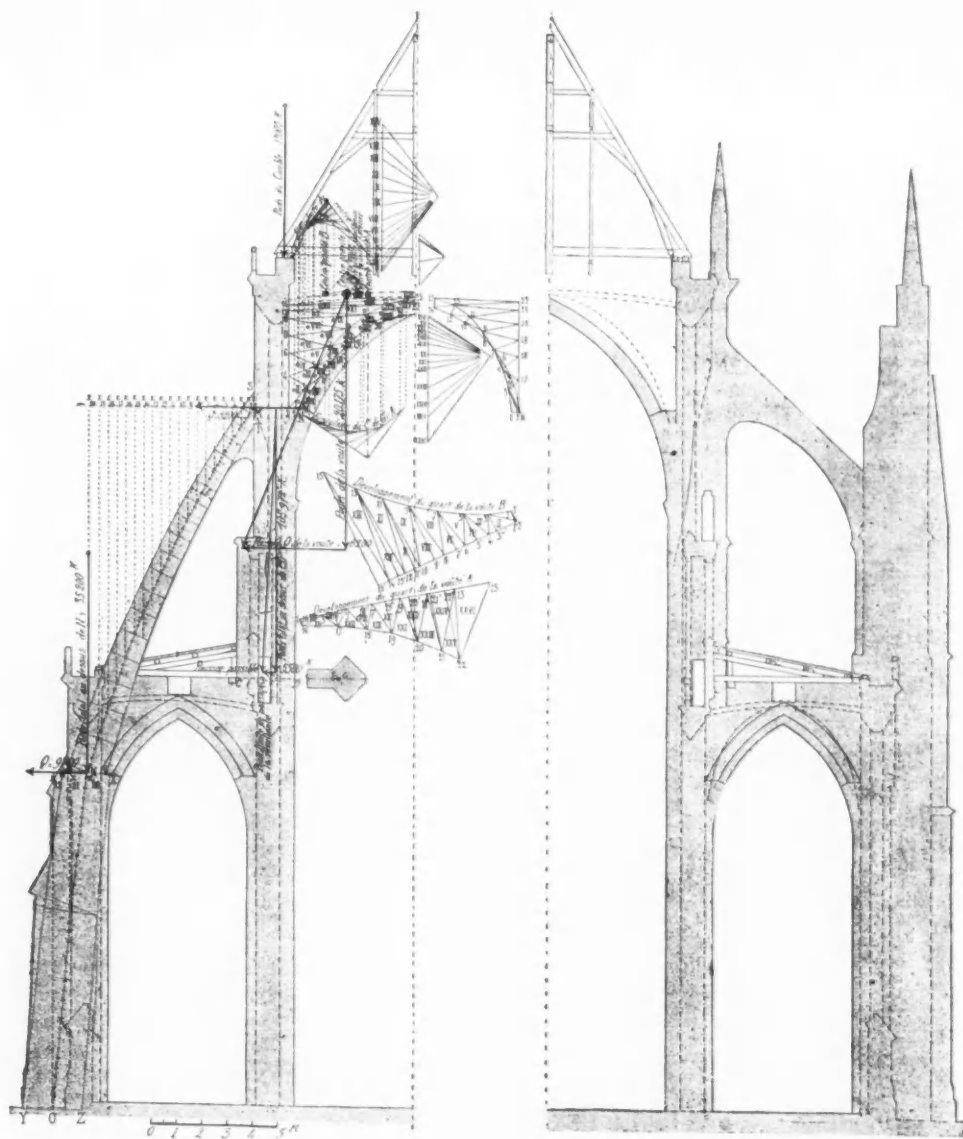


FIG. 6. THRUSTS AND BUTTRESSINGS OF ST. OUVEN, ROUEN, THEORETICAL AND ACTUAL.
(From Guadet)

French names of *ogives* (groin-ribs), *doubleaux* (transverse ribs), and *formerets* (wall-ribs)—on the one hand and the subordinate *tiercerons*, *liernes*,* and ridge-ribs on the other: all these fundamentals of Gothic vault-science he set forth with great clearness in his epoch-making essay. He pointed out the fundamental structural difference between groin vaults without groin-ribs, such as one sees in many Romanesque side-aisles, and those with such ribs.† He traced the evolution of the fan vault from the tierceron vault in England and explained the methods of the English vault-builders.

All this is a part of the common knowledge of to-day; but Willis was the pioneer in making it so. He never used the word "logic" in his essay, but he revealed the logic itself of the Gothic vault. It was Viollet-le-Duc who introduced and emphasized the term, in his remarkable discussions of vaulting in the articles "Construction" and "Voûte" of his *Dictionnaire*. He carried the discussion much further than Willis, and has been followed by most American writers in the same strain. Among these, it is Moore, followed by Porter, who dwells most frequently and insistently on the French logic in vaulting. Professor Moore's analysis of the historical development of the French vaulting system through the succession of the churches and cathedrals in which the problem was worked out is masterly, in method, in detailed treatment and in scholarship. It is especially strong in its study of the trapezoidal bays of the ambulatories. In his treatment of the logic of vaulting in the English medieval architecture he is less happy. His eyes seem closed to the possibility of logic

following other lines than those of the French builders. But of this I shall speak in some detail in the closing paper of this series, on English and Italian Gothic architecture. To Moore, to Porter, who has brilliantly set forth the original contribution of the Lombard builders to the science of vaulting, and to Frothingham, we owe an especial debt for their studies on this subject. They have made very clear the processes by which the French Gothic vaulting was evolved.*

The historic evolution of the Gothic buttress-system was first adequately set forth by Viollet-le-Duc. This system plays so much less important a part in English than in French architecture that it has received proportionately less attention from the English than from the French writers until recent years. The American writers have followed the French lead, with original investigations and contributions of their own. The so-called flying-buttress is now perfectly well understood as the one essential feature without which the French Gothic development of loftiness and of suppression of walls—the Gothic system of the framed skeleton of stone—could never have been realized. By its means alone was it possible to reduce the mass and area of all the supports, increase all the heights, and enlarge the clear-story windows to splendid dimensions. By its means the *weights* were distinguished from the *thrusts*. These last were concentrated by the ribs of the groined vaulting into strains exerted at particular points, namely somewhere in the clear-story above each pier. The "flying" or half-arches abutting against the clear-story between each pair of windows receive these thrusts and transmit them across and above the side-aisle roofs to the buttresses proper. These last are masses of masonry, very deep in the direction of the thrust, i. e., transversely to the length of the church. Where there is no side-aisle, as in the Sainte Chapelle at Paris, there is no occasion for flying-arches, as the buttresses are built di-

*It is to be observed that in his earlier "Architecture of the Middle Ages" (1835), Willis used the term "lierne" to designate the ridge-ribs. In the "Essay on Vaults" he distinguished between the ridge-ribs and the short bridging-ribs which he now calls "liernes."

†In the admirable Volume III, lately published, of the Sturgis-Frothingham "History of Architecture," Professor Frothingham uses the word "groin" as synonymous with "groin-rib." A groined vault, in his use of the term, is a groin-ribbed vault; a quadripartite vault without groin-ribs he calls an intersecting vault. This usage is not warranted by the generally accepted definition of "groin," which properly means the salient angle or arris formed by the intersection of two barrel-vaults of equal height, whether furnished with a rib or not.

*The whole subject of vaulting is admirably treated, with a wealth of illuminating illustrations, in the article "Vault," by the late Charles Babcock, in the Sturgis "Dictionary of Architecture."



FIG. 7. VAULTING SHAFT CARRIED BY
CORBEL, LINCOLN CATHEDRAL NAVE.

rectly against the main structure. The fundamental logic of the flying-buttress consists, first, in applying localized resistances to the localized thrusts; and secondly, in applying this resistance by means of the half-arch as nearly as possible at the central or critical point of outward pressure of the vault. But since the engineering science of the French Gothic builders was empirical, not mathematical, they had to guess at the point where the thrust would emerge (i. e., most forcibly press outward), and they made many mistakes in their guesses. Some of the early half-arches are very high, some low; some very thin and light, some very deep, as at Noyon and St. Rémy at Reims. As the style advanced, the arches were made lighter and were doubled, one above the other, thus making sure of catching the thrust between them. Two additional features of the French system must be mentioned: the wall-buttress and the pinnacle. The wall buttress is a shallow buttress built against the clearstory-wall; it starts from above the shaft carrying the transverse arch of the side-aisle vault, and thickens and buttresses the wall of both triforium and clearstory. Its upper part receives the upper end of the half-arch or half-arches of the flying-buttress system. In the Middle Gothic period it was enriched by colonnettes, sometimes engaged, sometimes free-standing. In many cases the latter sort, by detaching and isolating a part of its mass, distinctly weakens the wall buttress instead of strengthening it. The pinnacle was a decorative device which is commonly explained as intended to load the buttress and thus to deflect downward the resultant of the thrusts and thereby increase the resisting power of the buttress. I confess that this explanation is to me not very convincing. Except in the case of Reims, the mass and weight of the pinnacle are so small in proportion to that of the buttress that its value as a steadying load is slight; while its decorative value is so great that it is hard to believe this was not the determining element of its design. Comparing Chartres, where the pinnacle was placed over the inner half of the buttress, with Amiens where it

was placed over the outer edge Moore says: "it was presently seen that it would be more effectual if placed further out." This is an evident mistake; for the most effective loading must of course be that on the inner half of the buttress, where it would tend to resist the overturning of the latter; not on the outer edge, where it would increase, if anything, the tendency to tip over outward. If then the function of the pinnacle was chiefly to load the buttress and steady it against overturn or disruption by the vault-thrust, the logic of the French builders failed them here. If on the other hand its function was mainly esthetic, its position on the outer edge is fully justified; it looks better there. Indeed, from the point of view of pure structural logic, one of the most scientifically disposed buttress-systems is that of St. Rémy at Reims, a very early example; but it is unquestionably ugly, and excessive in the amount of its inert masonry.

The late Julien Guadet, in his *Théorie de l'Architecture*,* has analyzed by the graphical method the thrusts of the late Gothic Church of St. Ouen at Rouen, and worked out the theoretical direction of the resultant and the form of the flying arch and buttress best fitted to receive and transmit it. (See Fig. 6.) It will be seen that the French builders were far from conforming to this ideal type, but that in St. Ouen they came nearer to it than in most examples. This analysis moreover clearly shows the function of the arch to be that of a stone strut, *transmitting* the thrust to the buttress which absorbs and kills it—not that of an active member *opposing* its "counter-thrust" to "counterbalance" that of the vault, as is so commonly asserted (e. g., Moore, Porter, Frothingham). The only "balanced thrusts" are really those of adjacent pier-arches and wall-arches and transverse vaults, which do thus balance each other. The thinness of many French buttress-arches in section, as those of Notre Dame at Paris, proves that their builders understood clearly that they were building arched struts. Had they wished to oppose

*"Éléments et Théorie de l'Architecture." 4 vols.; Paris, 1902.

arch-thrusts to vault-thrusts, they would have built full arches of great mass instead of slender half-arches. They understood that element of their problem better than do some of their modern critics.*

Returning now to the interior of the Gothic structure, let us consider the function of the vaulting shafts—those long and slender shafts or groups of shafts engaged in the masonry of the central aisle and rising to the spring of the vaulting-ribs which they appear to support. They are a highly-important feature of the interior architecture of French churches; far less conspicuous in the English. Most modern writers dwell more or less insistently on their importance as structural members of the Gothic framework. Professor Moore has made them the object of special study, and both in his *Development of Gothic Architecture* and his *Medieval Church Architecture of England* he points out the pre-eminence of the French structural logic, which assigned a separate shaft to each vault-rib, and started the shafts from the pavement, or at least from the cap of the pier. The English, on the other hand, often made one shaft carry several ribs, and started the shaft in many cases from a corbel between the pier arches or even from a corbel in the triforium story. This, Moore declares to be structurally illogical (Fig. 7).

Now as a matter of fact, the English practice is structurally more truly logical than the French. For the vaulting shafts do not carry the vaulting; they only appear to do so. They are not structurally necessary; they might be hewn away with perfect safety. Indeed, in many cases they have been hewn away at least in part, to make room for later constructions or simply to gain space on the floor. The vault-ribs might with perfect safety be carried by a stout

corbel, for the resultant of their combined weight and thrust passes out into the clearstory wall and pier in an oblique line, not straight downwards inside of the clearstory walls. The English builders understood this perfectly: so doubtless did the French. In both cases the practice adopted was determined *not by structural but by esthetic logic*. To satisfy the eye, by an apparent visible support, adding to the apparent strength of the slender vertical framework of the French church, and at the same time to reinforce the upward movement, the vertical emphasis of the interior design, the French builders felt the *esthetic* necessity of these long groups of shafts. They were an invaluable reinforcement of the expression of soaring height which they sought to produce in their cathedrals and churches. The English, on the other hand, deliberately sacrificed height to length, and lightness to massive richness. Their broad piers and thick clearstory walls did not require the apparent reinforcement of the long, grouped vaulting shafts, and they did not care to multiply to the limit their vertical lines. Structurally it was quite proper, logical and sufficient to start the shafts from corbels somewhere above the pier-caps. Grant that the English were less skilful builders than the French, timid about lofty vaults, and that they persisted in retaining an almost Romanesque massiveness in their designs; the true criterion of the merit of their use of vaulting-shafts is not that of structural logic alone—in which they showed, after all, in this one detail at least, more science than the French—but also that of esthetic logic. Does their construction appear consistent and stable to the eye? Is it satisfying in appearance, or inadequate and inharmonious? There is room for differences of opinion here, of course, but no justification for dogmatic condemnation based on an incorrect thesis.

I believe that an unprejudiced study of the historico-critical literature of Gothic architecture, accompanied by an equally unprejudiced study of the monuments, will lead to the conclusion that emphasis upon the element of purely

*Mr. T. G. Jackson in his "Gothic Architecture" cited above, contends that the half-arch exerts a perceptible counter-thrust against the vault. This is true; a ladder leaning against a wall thrusts measurably against it. But this is an almost negligible factor in proportion to the vault-thrusts which the flying buttress opposes, and Mr. Jackson notes that the French ignored it often by providing a strong vertical support for the upper end of the half-arch, thus almost wholly neutralizing its horizontal push.

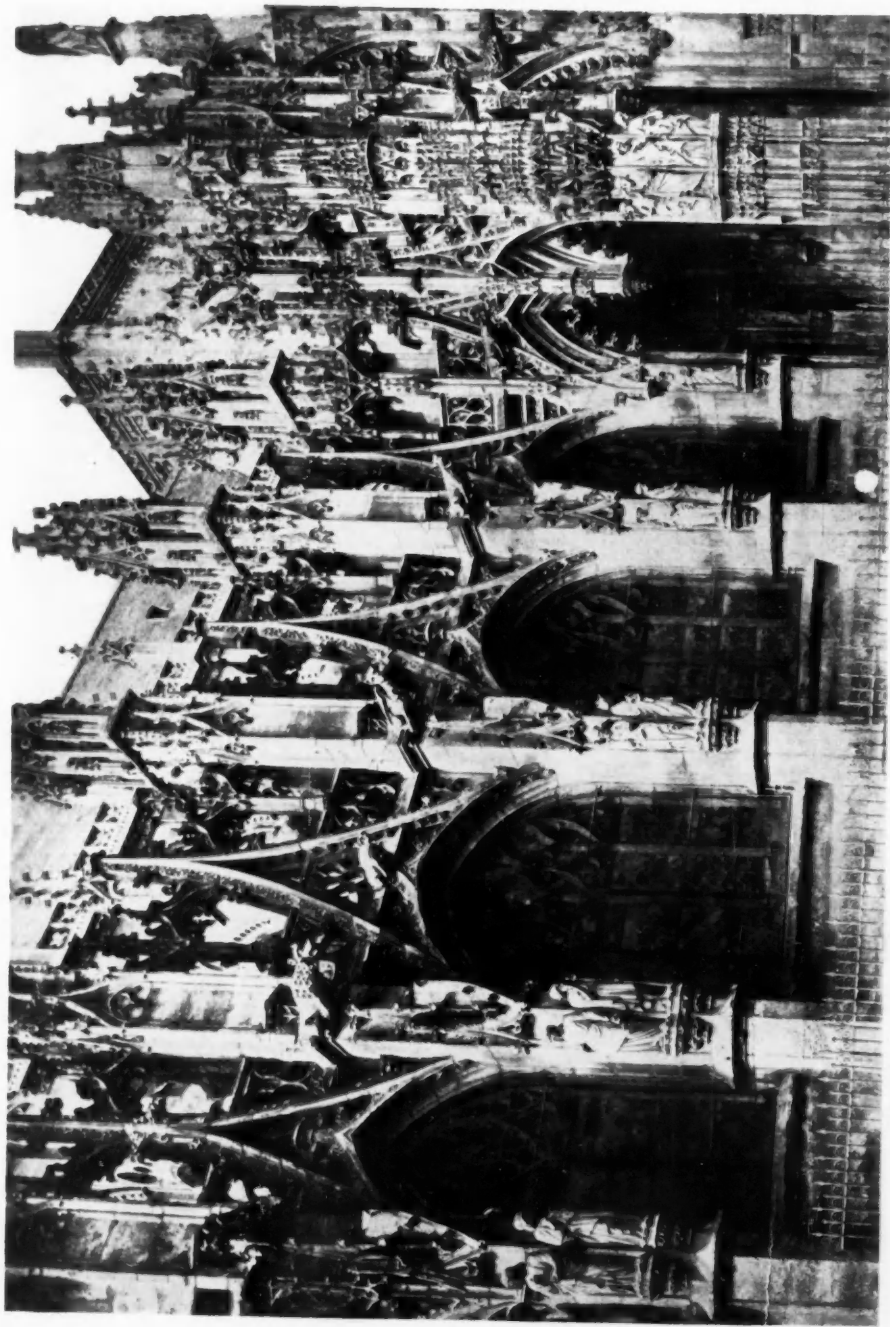


FIG. 8. CHURCH OF ST. PIERRE, LOUVIERS.

scientific logic to the exclusion of other considerations, gives a distorted view of the true processes by which the Gothic styles and monuments were evolved. It overlooks the influence of that esthetic logic which shapes the building, as a whole and as to its constituent parts, with a view to the esthetic appeal it will make to the emotions through the eyes. It tends to belittle the influence of imagination and pure fancy, of the architect's effort to visualize in stone his dream-creations. Having set up the logic of scientific construction as the basis and criterion of Gothic design, it seeks a scientific justification for elements in that design which were really the results of esthetic reasoning and then condemns other features, equally beautiful, for which it cannot find or invent similar structural justification. But the public and the generality of educated architects refuse to judge the Gothic monuments by such a narrow criterion. Admitting freely the structural logic evident in their design, we nevertheless find them full of lovely features which might be stripped away without the slightest damage to the structural framework of the building. All the lofty spires are in reality purely decorative adjuncts. All the lovely open-work gables are "constructed ornaments," pure and simple. All the wall-traceries, niches and tabernacles are the products of the artistic imagination, having no function in the structural framework. Nine-tenths of the slender pinnacles have none but an imaginary value as structural loads. The vaulting-shafts are not needed for sustaining the vault-ribs. But *every one of these features has its valid and necessary place in the esthetic scheme of the design.* The Gothic builders of France were not merely mathematicians and engineers, they were artists, dreamers of dreams, seers of lovely visions. It is not too much to say that the structural logic they displayed was the servant of their artistic imagination, rather than its tyrannical master. It is perfectly plain that, however stern that logic may have been in the earlier formative stages of the Gothic styles, it became more and more sub-

servient to esthetic considerations as time went on. As Moore has pointed out (see *ante* p. 102), the beauty and flexibility of proportion of the pointed arch were perhaps quite as important a factor in the adoption and development in Gothic architecture as its diminished thrust or its value in lifting the ridge of the cross-vault. From the early years of the thirteenth century and for a hundred years and more thereafter, art and science, reason and imagination walked, as it were, hand in hand, worked side by side in harmonious agreement, to produce the most consummate marvels of the medieval architecture. With the fourteenth century the artist begins to push the engineer into the background. The structural problems had been solved. The logic and science of the early experimentation had become the common property of the craft. The decorative path was the only forward path open: stagnation or dull repetition was the only alternative to greater richness of embellishment. Structural logic was not ignored nor even forgotten; it is there, underlying the fundamental design, but clothed in a dress whose beauty and whose marvelous execution are their own justification, extorting praise even from unwilling critics who would fain measure everything by the formulae of structural expression.

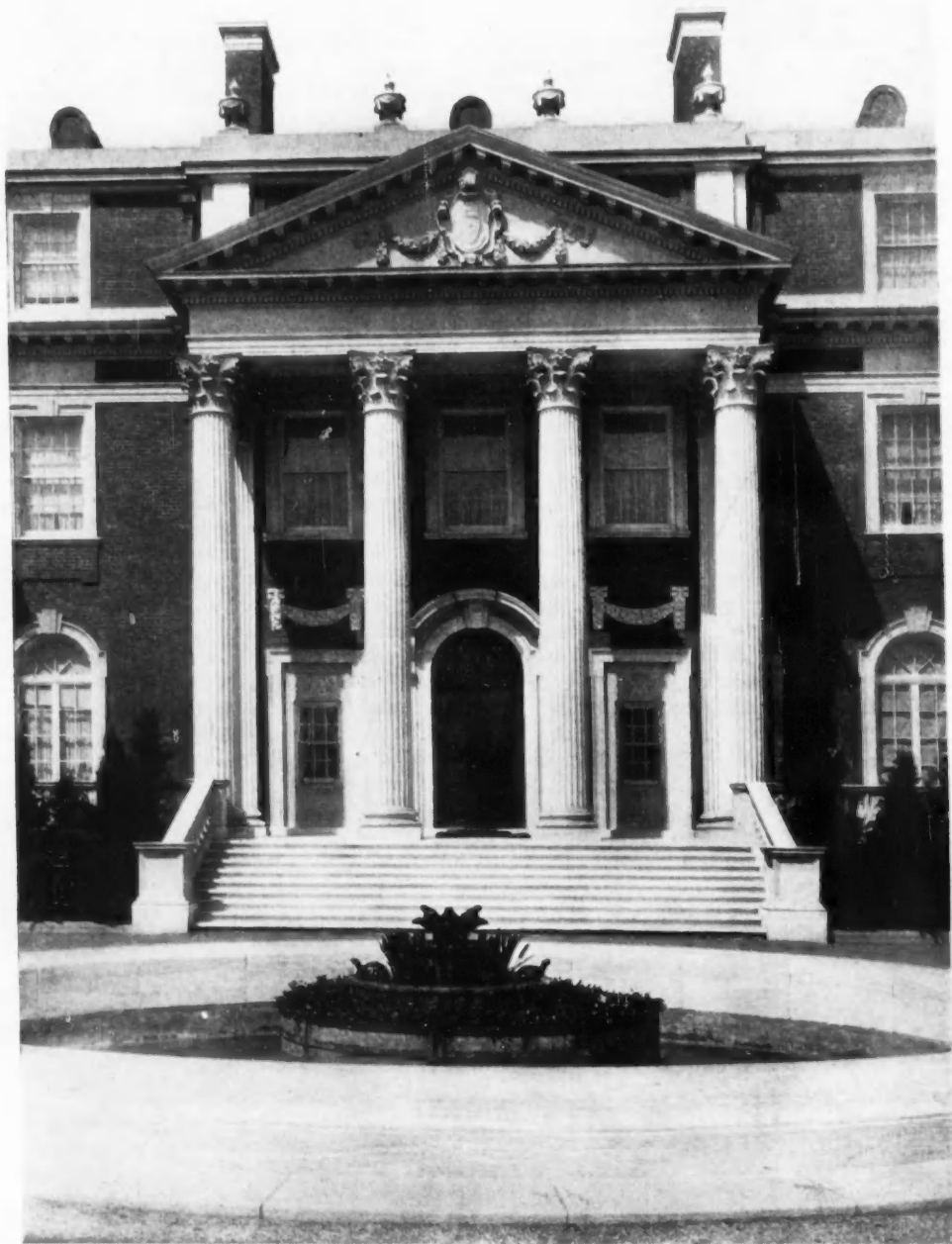
It has long been the fashion to decry the Flamboyant monuments of France as the products of a decadent style; but not all competent critics are ready to subscribe to this sweeping condemnation. "Whatever they may lack," says Cram, "of the splendid consistency and the divine serenity of the thirteenth century, they are nevertheless among the loveliest works of man." They doubtless lack the "serenity," the severe majesty of the earlier monuments, their *naïf* structural expressiveness. But it must be remembered that they are for the most part buildings of moderate size, in which grandeur and majesty are not to be looked for, and to which we cannot apply the norm of the great cathedrals. The expression of structure is there, after all, even though veiled under a dress of elaborate ornament. There is

room in the world of architectural beauty for more than one kind of excellence; for loveliness of apparel as well as for the stateliness of heroic nudity. To admire superb anatomy does not forbid our admiring also superb costuming. The richness, intricacy and beauty of the detail of Flamboyant buildings, even the riotous extravagance of their pinnacles and traceries, entitle them to our unrestrained admiration. Their expression of structure is less conspicuous than in the earlier works, but their decorative invention and luxuriant fancy, directed by a marvelous esthetic instinct, constitute them works of art in the highest sense.

By the middle of the fourteenth century nearly all the great cathedrals had been built, at least in France and England. The problems of the "Flamboyant" builders, so far as ecclesiastical architecture is concerned, were either parish churches, large and small, or the alteration and completion of existing cathedrals. Some of the larger problems of this sort they handled with consummate skill: witness the majestic, original and structurally logical cathedral of Alby; the stupendous wonder of the rebuilt choir of Beauvais; the lofty elegance of St. Ouen at Rouen, whose chief fault is that it is even more mechanically perfect than Amiens; the choir and transepts of St. Nazaire at Carcassonne; the beautiful choir of Mont-St. Michel. Among lesser works one may be permitted to admire the

delicate beauty of St. Maclou at Rouen, the portals of Troyes and Tours, even the over-wrought luxuriance of the church at Louviers and the lace-like fragility of the front of Rouen cathedral. The logic of scientific construction and the frank expression of structural methods and devices deserve our admiration, and in Gothic architecture they play a most important part, to which the critics have done ample justice. But let not the critics frighten us out of our right to enjoy to the full every whit of the decorative loveliness with which the later medieval artists endowed their creations.

Architecture is, after all, not a science; it is pre-eminently an art, in which imagination and the love of pure beauty of form have their place. There is a logic of beauty as well as a logic of stability, and the appeal to the esthetic emotions is at least as important as the appeal to the intellect. Who would shift a single column or arch of that most illogical of all façades, the front of St. Mark's at Venice? The front of Peterborough is logically absurd; so also, we are told, is the lantern of St. Ouen at Rouen; but God forbid that ever a stone or a line of their lawless beauty be removed, or a "logical" structure be erected in their place! Is it not, after all, the beauty rather than the logic of the architectural masterpieces of all the ages, that wins our admiration, and stirs the deepest tides of our emotions?



SOUTH PORTICO—COUNTRY HOUSE OF ORMOND G. SMITH,
ESQ., OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



SUPERINTENDENT'S COTTAGE—COUNTRY PLACE OF ORMOND G. SMITH, ESQ., OYSTER BAY, L. I.
Hoppin & Koen, Architects.

THE COUNTRY HOUSE OF ORMOND G. SMITH, ESQ. OYSTER BAY, L. I.

HOPPIN & KOEN, ARCHITECTS

BY DE WITT H. FESSENDEN

IN his admirable summary of the past quarter-century of American architecture, Prof. Hamlin correctly emphasized the progress made in country house design in recent years. The demand for country houses continues to be as great as ever in all parts of the country and, in respect to this particular type of building at least, seems to contradict the observation of Prof. Hamlin that the period of great architectural expansion is almost over. Houses recently built of all kinds and sizes, reflecting a great range of taste, modes of living and individual requirement, all point to a growth that is wholly normal and sound.

The variety of our houses is really extraordinary.

Along with simplification and appreciation of outdoor life—at once a result and a cause of good taste—there

has been also a certain increase of luxury and extravagance, which is reflected in architectural design. Such ostentation is seen not only in size and decoration, but also in multiplication of services and conveniences, and in the addition of much complication as regards mechanical equipment. However, an architect will hardly regret luxury that finds expression in beauty of form and color.

Mr. Ormond G. Smith's country home, "Shoremond," at Oyster Bay, Long Island, designed by Hoppin and Koen, is a symmetrical Georgian residence which forms, with its dependencies of garage, overseer's house and workmen's cottages, a little community in an appropriate landscape setting. The site is on the brow of a hill overlooking Oyster Bay, with the buildings so disposed as to gain the greatest benefit of the splendid view over the waters of Long Island Sound.

Passing the entrance gates and the superintendent's cottage, the drive, flanked by shrubbery, winds at a gentle incline up hill to the east, and with a turn at the top conducts one between formal rows of maples straight down to the unique enclosed forecourt, containing a decorative fountain. The house is an attractive one, of harmonious proportions, most cheerful and hospitable in appearance. Its main ornamental feature is a Corinthian portico, which opens from massive iron gates, and which stands in contrast to the simple treatment of the windows and entrance door. The effective brickwork is the result of copying some eighteenth century English bricks.

A wrought iron fence upon stone posts encircles the forecourt. Extremely simple and unassuming in design, it holds its position admirably in the general scheme, offering elliptical lines to balance the extremely wide porch steps. Aquatic plants form an agreeable setting for turtles and frogs which, perched upon a vine-clad base, spout streams of water merrily into the pool beneath, which reflects on the surface the white stone columns of the portico.

To the left is an Italian garden formally laid out with stone benches and fountains, making desirable accents amid the shrubs and greenery. On the opposite side, but entirely secluded by screens of foliage, is the service section, with entrance on a lower level.

The window spacing is excellent, and the casings of the doors with delicate mouldings in white Caen stone show up very effectively as well as pleasingly against the rich coloring of the bricks. On each side of the imposing grille opening are the two bronze lamps relieved against the brick and delicate stone carvings. Careful attention has been bestowed upon cornice and column caps, and upon the window spacing and the proportions of the wings, all heightening the fine general result.

The English eighteenth century country house has been the inspiration for that desirable feature of an entrance hall extending from the front to the rear, providing a vista into the garden beyond.

It is a real hall unobstructed by stairways and other intrusive factors. Passing through the hall to the other side one comes out under a circular portico set in a broad expanse of well kept lawn at the level of the porch floor and extending unobstructed, except for a sundial in the center of the path, to the concrete retaining wall, which acts as a bulwark to any buffeting of the waves of Oyster Bay.

The marble floor of the porch is of symmetrical design on a two-color system, set off by seats and vases scattered around. The design of the floor is a compass, with arrows giving the directions, let into the marble in mosaic style, the barbs being of bronze and scintillating in the sunlight like rays of gold. At either side of the doorway stand handsome pedestals with large bronze lanterns suspended immediately above, affording pleasing contrast with the moldings of the carved stonework. From this vantage point one observes to right and left sun parlor and breakfast room, which project from the building out in the terrace with its well-defined balustrade and cornice. Marble benches, tables and urns stand out in sharp relief against the blue waters of the bay.

The hall is used mainly as a passageway with scant furniture, just enough pieces to avoid the uncomfortable feeling of bareness. It follows precedent by being two stories high, with a balcony from which depends fine Eastern rugs and tapestries. The staircase, also of marble, is at the southern end, and rises at each side of the vestibule, which is concealed from the visitor as he surveys the broad length of the ample passage, opening off which are the principal rooms. Much might be said in praise of the door and window spacing and the marble mantel. This mantel, with its pilasters, affords a worthy enframement for the "old master." Then, too, one admires the fanciful brackets which support the well designed Colonial balustrade; also the elaborately paneled and decorated ceiling.

In decorating the interior the services of Miss Elsie de Wolfe were wisely invoked and she has assuredly given dis-

tion and grace to this Georgian mansion, where no pains have been spared to make inside and outside equally artistic. Owner, architect and decorator have proved themselves a triumvirate of good taste and able execution in the problem of conforming substantially to "period" design without being too literal or too slavish. That they have done this and at the same time steered through the Scylla and Charybdis of interior decoration, in carefully avoiding the ostentatious and the commonplace, speaks well for the result.

The music room has been treated with mulberry hangings and blue draperies; the library, with blue and silver hangings against lime wood in the manner of Christopher Wren, painted ceilings in bas-relief distinguishing the two rooms. In the guest room one is struck by the Directoire walls and the chintz hangings of red and blue, a design suggested by an ancient document, which harmonize delightfully with the blue taffeta silk curtains. The breakfast room is a typical English room, paneled and painted in cream color, the chintz curtains displaying a bold pattern design in old rose and pale green, over a gray-green rug. Another guest room has been handled in Chinese manner, with black and gold lacquer, rose and green silk brocade being freely used in the furniture and hangings.

The ladies' reception room has been designed in an unusual tone of mauve. The boudoir is decorated with paneled walls of a deep green shade, and an Aubusson rug of rose, green and cream, with dashes of blue. A beautiful French crystal chandelier, brocaded silk furniture, upholstering and needle-work

chairs, give a fine effect to this apartment.

A men's reception room has been designed in Adams style; wheel-back chairs and a black rug with red border are suitable settings to the general scheme of red and blue upholstery and hangings; touches of silver here and there heighten the effect of the whole.

The dining room, opening into the breakfast room, is chiefly remarkable for its Chinese Chippendale table and chairs, upon a handsome Kermanshaw rug of huge proportion.

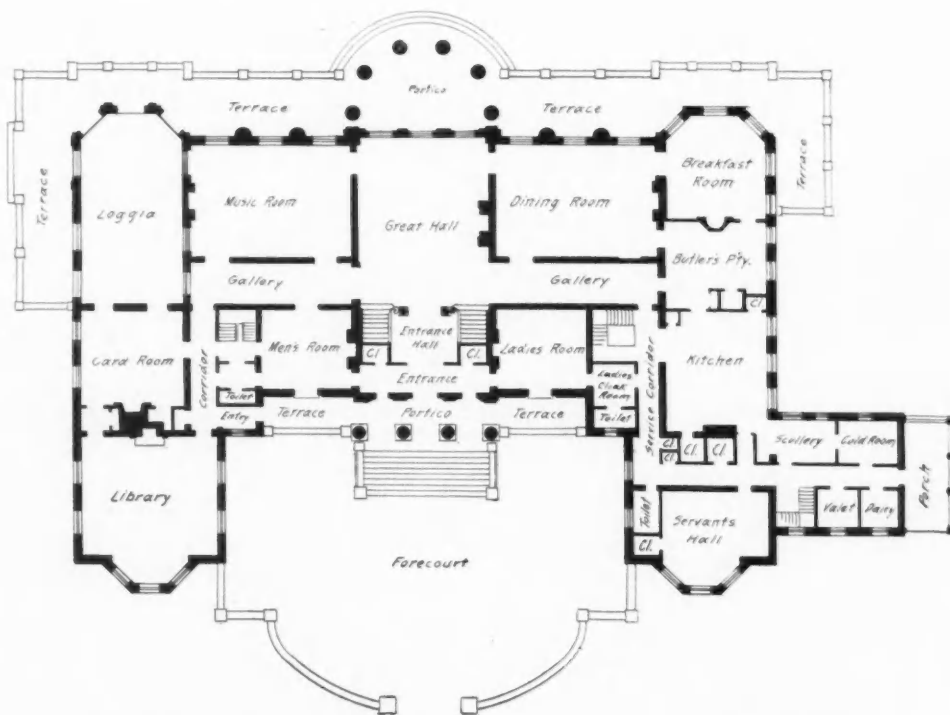
The loggia contains pale green lattice work against a terra cotta wall, the draperies are of striped taffeta silk in pale pink and green, the couch and chairs are covered with cream and green striped velvet, the floor is of marble mosaic, the rug terra cotta with black border. Each room has been individually treated in accordance with its special usage.

In walking about the grounds one pauses to inspect the commodious garage, with accommodation for eight automobiles, and with rooms above for housing the chauffeurs of house-guests. To the right of the garage are stables for riding-horses, whilst the left part of the garage houses the head chauffeur. In front of the superintendent's house is a pond, which besides contributing largely to the beauty of the grounds, has also its practical side, as it provides the ice supply for the household.

It may be noted incidentally that the estate is a farm which is really self-supporting—not perhaps from a book-keeping standpoint, but to the extent that it provides all the ordinary requirements of family consumption and upkeep.



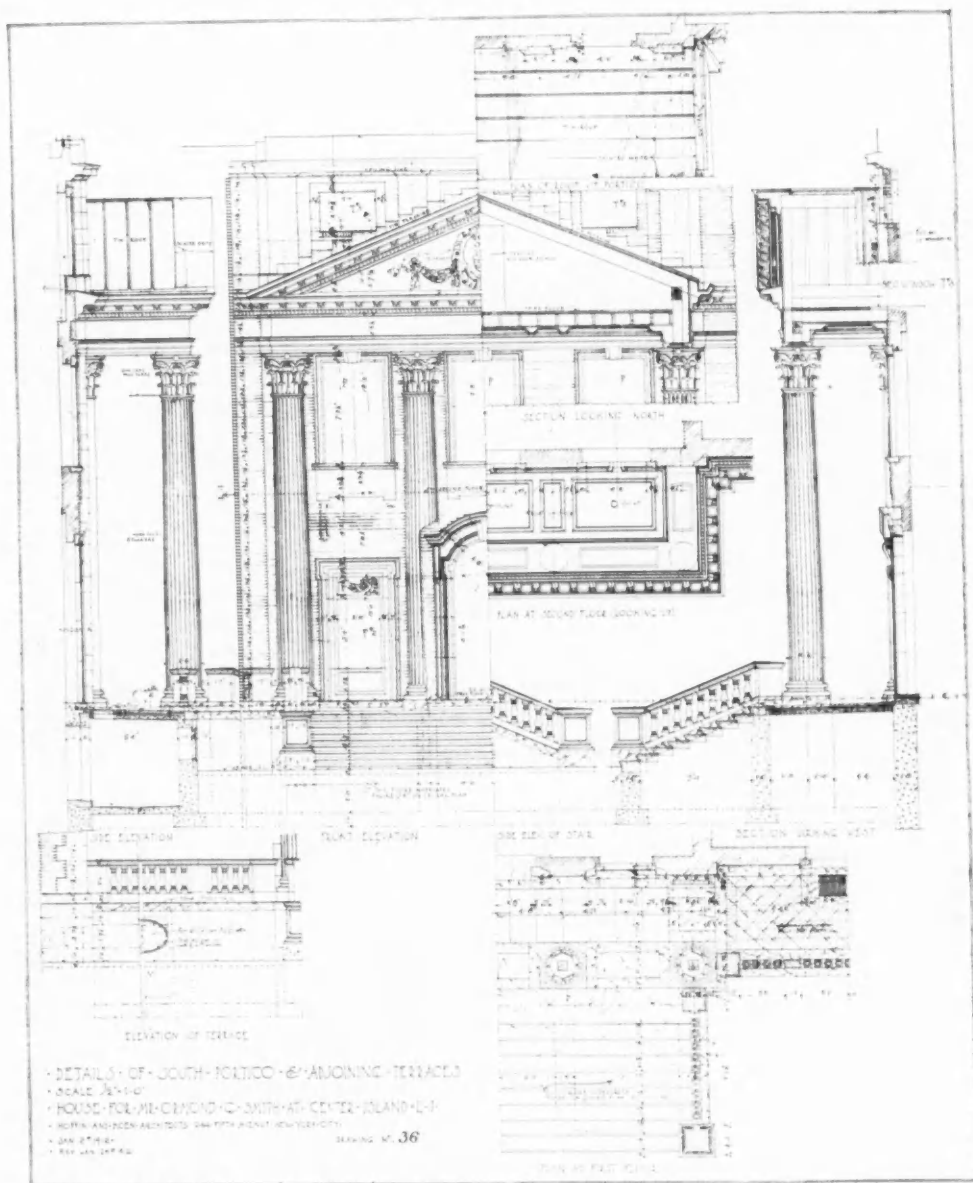
PLAN OF SECOND FLOOR—COUNTRY HOUSE OF ORMOND G. SMITH, ESQ., OYSTER BAY, L. I.
Hoppin & Koen, Architects.



PLAN OF FIRST FLOOR—COUNTRY HOUSE OF ORMOND G. SMITH, ESQ., OYSTER BAY, L. I.
Hoppin & Koen, Architects.

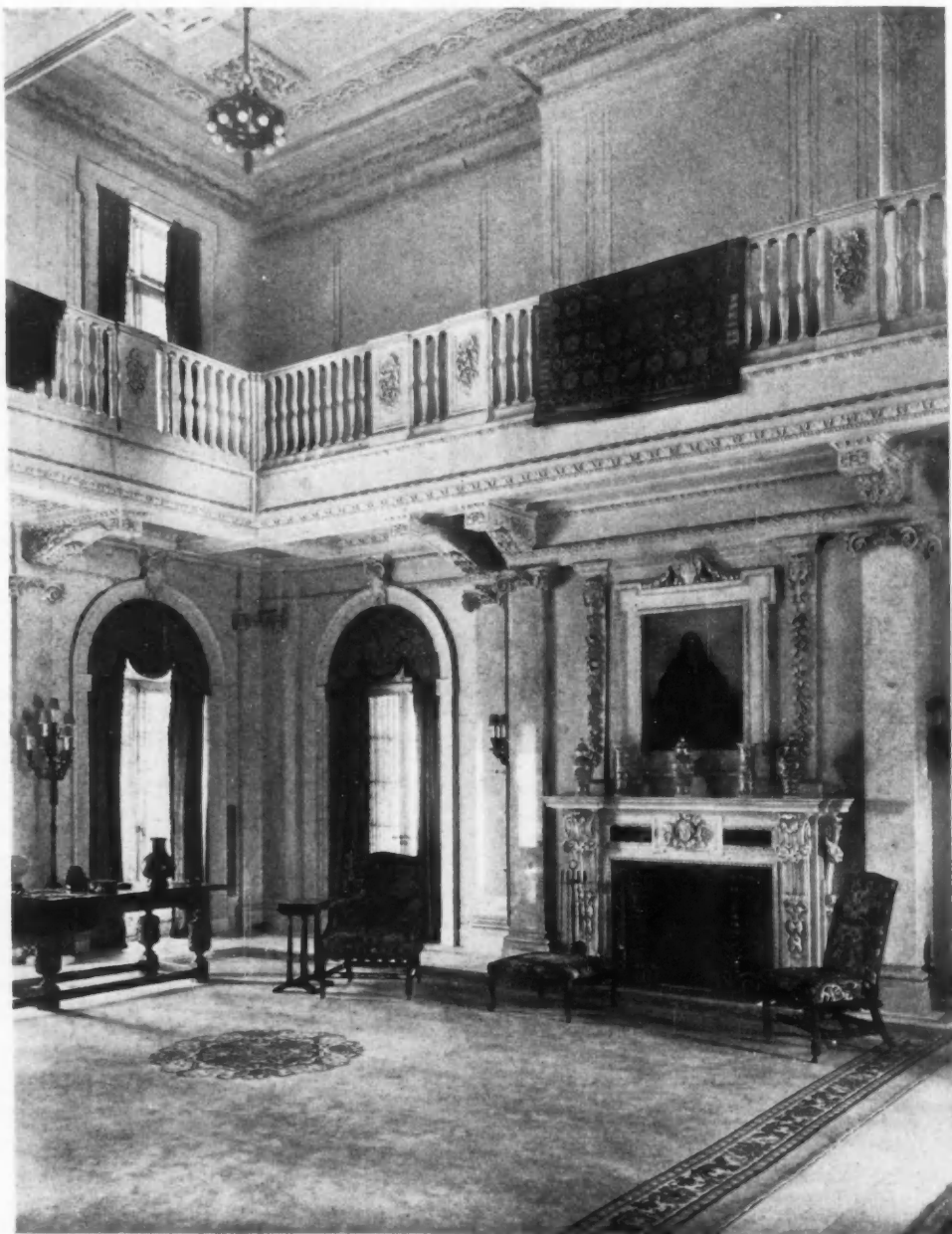


COUNTRY HOUSE OF ORMOND G. SMITH, ESQ.,
OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.





SOUTH ELEVATION. COUNTRY HOUSE OF ORMOND G. SMITH,
ESQ., OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



MAIN HALL—COUNTRY HOUSE OF ORMOND G. SMITH,
ESQ., OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



BOUDOIR—COUNTRY HOUSE OF ORMOND G. SMITH, ESQ.,
OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



MEN'S ROOM—COUNTRY HOUSE OF ORMOND G. SMITH,
ESQ., OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



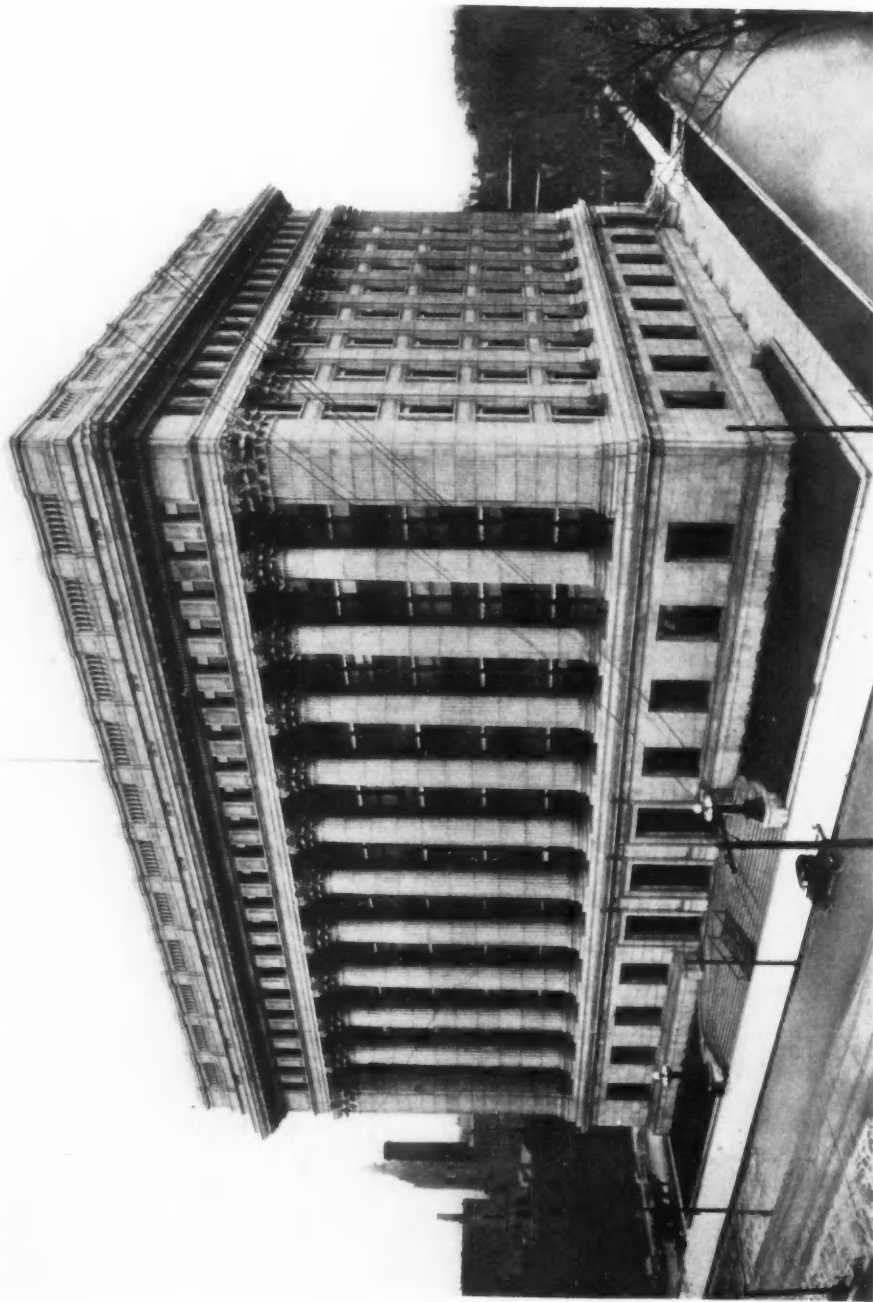
DINING ROOM - COUNTRY HOUSE OF ORMOND G. SMITH,
ESQ., OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



NORTH ELEVATION—COUNTRY HOUSE OF ORMOND G. SMITH,
ESQ., OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



GARAGE AND CHAUFFEUR'S QUARTERS - COUNTRY PLACE OF ORMOND G. SMITH, ESQ., OYSTER BAY, L. I. HOPPIN & KOEN, ARCHITECTS.



NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY'S BUILDING, MILWAUKEE, WIS. MARSHALL & FOX, ARCHITECTS.

MILWAUKEE REVISITED

The NORTHWESTERN MUTUAL
LIFE INSURANCE COMPANY'S
LAST NEW BUILDING
MARSHALL & FOX ARCHITECTS



BY PETER B. WIGHT



AFTER an absence of several years from Milwaukee one is strongly impressed, on revisiting it for the purpose of studying its latest architectural acquisition, with the peculiar position of this thriving city as illustrating the progress of architectural development in the Middle West during the last forty-five years. Milwaukee is one of the oldest cities in what was once called "The West." It is one of a string of towns on the west coast of Lake Michigan, Kenosha, Racine and Milwaukee, which men still living read of in their school geographies, before Chicago was ever heard of, in answer to the question, "What are the principal cities on the west shore of Lake Michigan?" All of these, being in the State of Wisconsin, were settled early by German immigrants and grew rapidly in population and wealth. They had the best ports of entry on the lake and were at the mouths of small rivers draining into it, while Chicago was afterwards settled upon a small, sluggish creek which drained only a small district to the north of its mouth at the lake, flowing southward almost parallel to another, the Desplaines River, which flowed into the Mississippi Valley. The only reason for its settlement was that it was the site of old Fort Dearborn, a trading post which commanded the divide between the lakes and the Mississippi and was built to protect it against incursions from the Indians. This divide is said to have been only eleven feet high at the lowest part, and Chicago, built on low-lying ground, did not become a city of any importance until the State of Illinois built the Illinois and Michigan Canal connecting the Chicago with the Illinois River at Joliet, which opened an avenue for navigation

between the lake and the inland river system at about the year 1836. Chicago was not incorporated until that year.

Meanwhile the three cities above mentioned grew fast and flourished. They were built on high ground and had good harbors at the mouths of the rivers on which they were located. The two most southerly ones did not grow as rapidly as Milwaukee, and gradually developed into manufacturing towns, which they still are. Milwaukee was a place of export for the agricultural products of the great productive State of Wisconsin, which not only produced wheat and corn, but cattle and hogs, the latter supplying great packing houses years before they were established in Chicago, though in course of time the largest and oldest of them was moved to that city, where its main branch had been established. There also were established breweries for which the German population of the State furnished the first customers, but their trade eventually extended over the whole country as means of transportation began to be established.

Hence Milwaukee became one of the wealthiest cities in America in proportion to its population. There was nothing sensational about its rapid growth. It did not need any advertisement, and held its own business, independent of competition with Chicago, which after 1850 began to exceed it rapidly in population. But Milwaukee has always grown rapidly and substantially in wealth and public improvements until its population now is about half a million. It was also more substantially built than Chicago, and yet its buildings had no architectural pretensions until about 1870. They were mostly of brick and four stories high. After that time its wealth became evident

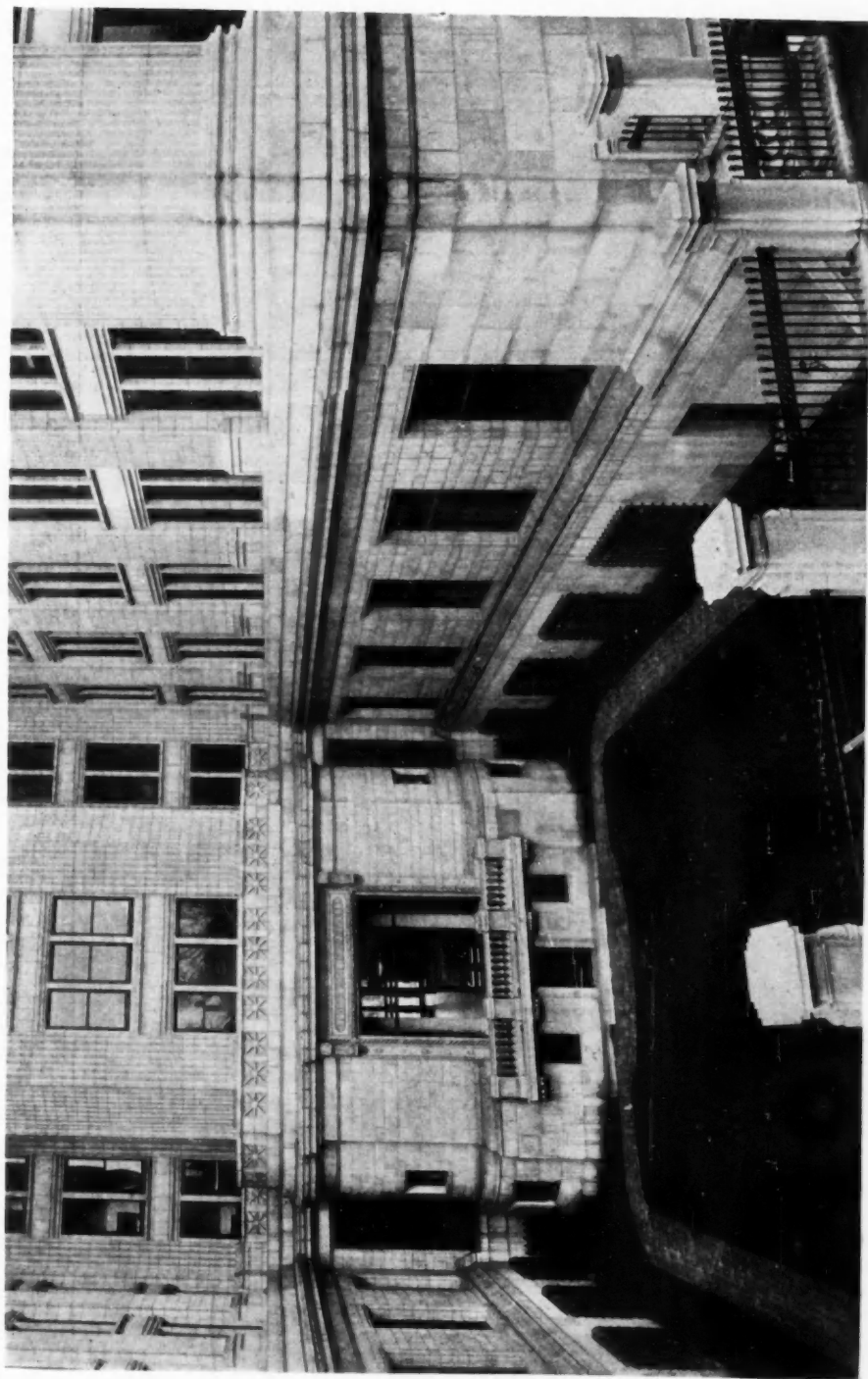
in a number of large and costly structures interspersed between the smaller and cheaper ones. But there has been no general rebuilding in the older and central part of the city, as in Chicago, and the principal buildings stand out prominently among the older and smaller ones. Wisconsin street has always been the main street and it is only a little more than half a mile long, running east and west from the main river bridge to the bluff on the shore of the lake. The west end near the bridge was its business end, and it became the leading residence street as the lake was approached, and this part, where the main subject of this article is located, became the best residence district. This in time extended north to Wisconsin street, and the business district was south of it. Michigan street is the next to the south and Mason street the next to the north. Between these two streets, with Wisconsin street in the center, are now located nearly all of the great buildings for which Milwaukee is famous, many of which, it may be said, were built "before their time."* But the money was always ready to erect monumental structures, all towering above the old four-story buildings of the early days, most of which remain, and give Milwaukee a sky line which has made it famous. Of course the city had to extend westward, so that west of the principal bridge (one of a dozen or more) Wisconsin street has become Grand avenue and is lined with pretentious stores and many theaters; and extends through a newer residence district, which rivals that of the north side on the bluffs overlooking Lake Michigan, and crosses a valley on one of the grandest concrete viaducts in this country, to another residence district which extends over other high ground farther west and forms a great suburb, where more of the half million residents live.

But there is not much distinctive architecture on the west side. With the exception of numerous churches and the

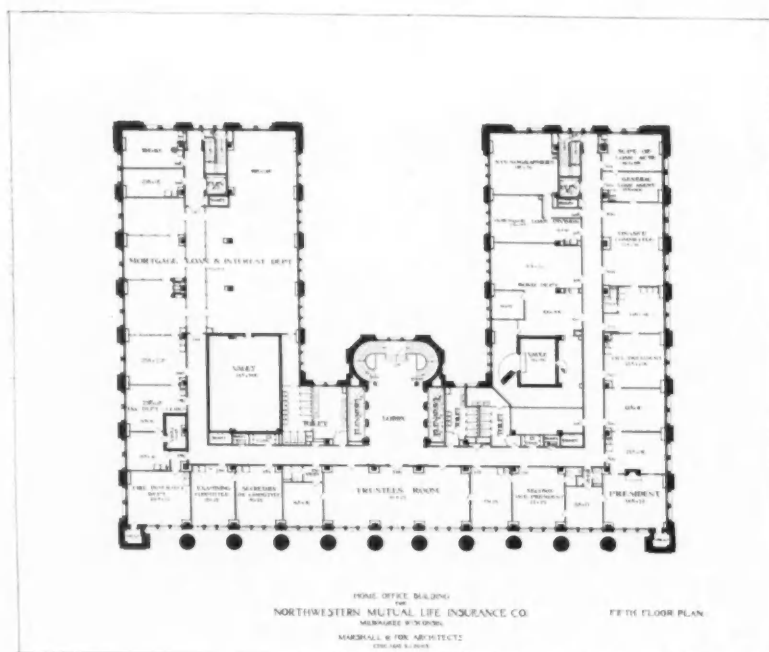
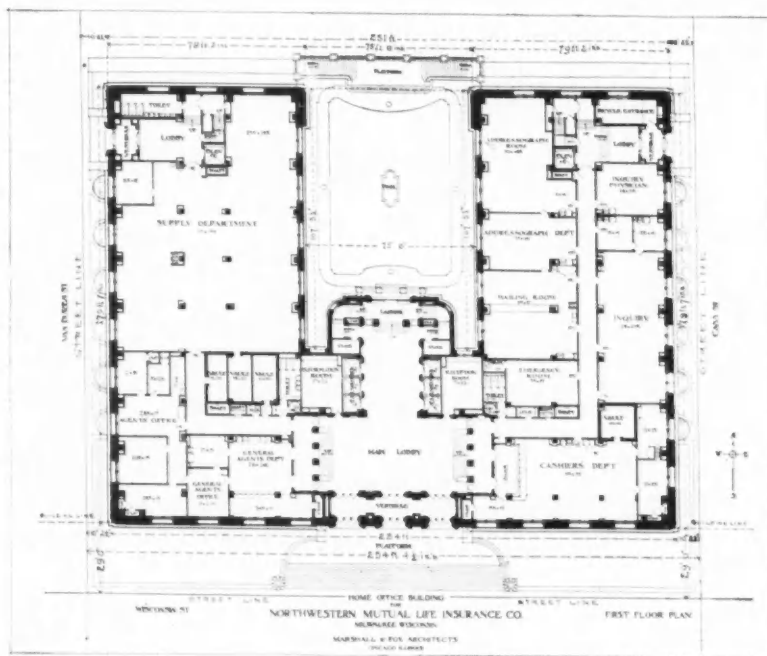
houses of the wealthy it is mostly of the cheap and showy kind, and most of it new. The monumental buildings are nearly all on Wisconsin street and its two neighbors. It is here that we find an illustration of the progress of American architecture in the Middle West, better than I have ever seen elsewhere, in great and costly structures built within the last forty years, whose merits and demerits can be readily compared; all erected by wealthy citizens and corporations with evident pride in the achievement, and from designs by different architects, some native to the city and some from other cities, some of whom I am unable to name. The limits of this article afford space to mention only a few of them, and such as give evidence of great public spirit on the part of Milwaukee's capitalists and great corporations.

Here are two of those erected for Alexander Mitchell, Milwaukee's great banker and capitalist, during the 70's. These cover the entire frontage of the block on Michigan street extending from Broadway to East Water street. At the corner of Broadway is the Chamber of Commerce, designed by E. T. Mix, of Milwaukee. It is in a nondescript style, but has a tower and a good sky line. It was designed when architects were trying to do something new without order or purpose. It has no style, but it has the merit of being fireproof, and was probably the beginning of fireproof buildings in that city. It is the first building in America in which all the individual members of the iron trusses which cross the main room were fireproofed with porous terra cotta. West of it, on the East Water street corner, is the Mitchell Building, Milwaukee's first high office building for brokers and commission merchants doing business at the Board of Trade. It was commenced immediately after the Board of Trade was completed. It is also a fireproof building, in which clay products were used. The exterior is in the Renaissance style as it was known at that time, and it is also by Mr. Mix. It has a high mansard roof, which also gives it an attractive sky line. These

*This is not to say that many large, important and handsome buildings, of good architecture, have not been erected within the last thirty years in other parts of Milwaukee; but it is the purpose of this article to refer only to those in the district the boundaries of which have been defined.



VIEW OF REAR COURT LOOKING SOUTH, SHOWING TERRA COTTA FACING OF COURT WALLS—NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY'S BUILDING, MILWAUKEE, WIS.

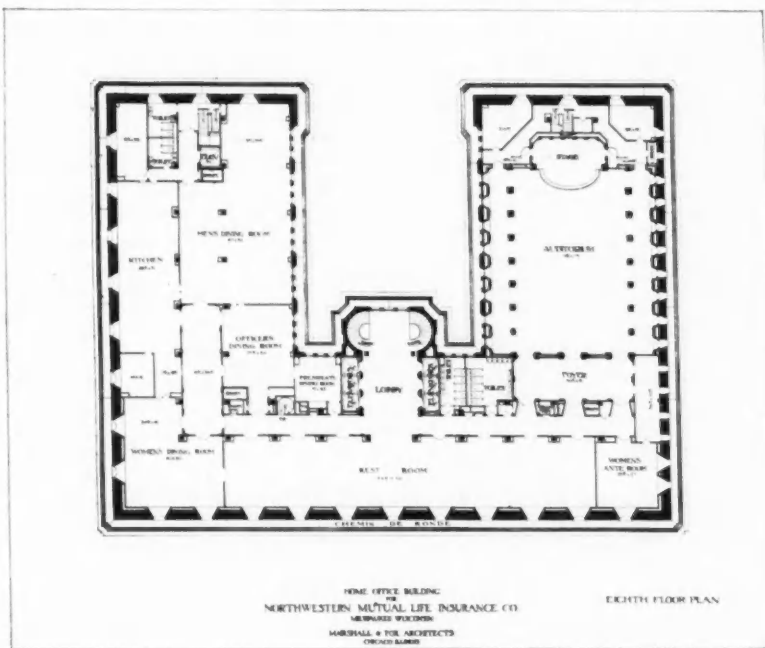


were the first large buildings of architectural pretensions built in Milwaukee.

The United States Government Building, the second that the government has erected in that city, occupies an entire square bounded on the north by Wisconsin street, on the south by Michigan street, and on the east and west by Jackson and Jefferson streets. It was erected about 1885, and is one of the largest and most costly local government buildings erected in this country. It is entirely of granite, with an enormous tower on the Wisconsin street front, and

terior show suggestions from the designs of Burnham and Root of the Rookery and Western Union Telegraph Building (formerly the Phoenix Insurance Building) at Chicago. The design has been carefully studied, shows decided progressive tendencies, and is far superior to the Board of Trade and the Mitchell Building.

The Wells Office Building is also on Wisconsin street, corner of Milwaukee street. It is an example of scholarly French Renaissance with excellent details, and is fifteen stories in height. It



in general plan resembles the famous courthouse by Richardson, at Pittsburgh. It was evidently studied from it by the architect of the Treasury Department at that time. Near it is the Hotel Phister, erected somewhat later from plans by Architect H. C. Koch, of Milwaukee. The exterior is of stone, brick and terra cotta, with much polished granite, and it is an excellent example of fireproof planning and construction—in fact is the first fireproof hotel erected in that city. It is at the corner of Wisconsin and Jefferson streets. The details of the ex-

terior show suggestions from the designs of Burnham and Root of the Rookery and Western Union Telegraph Building (formerly the Phoenix Insurance Building) at Chicago. The design has been carefully studied, shows decided progressive tendencies, and is far superior to the Board of Trade and the Mitchell Building.

The Pabst Office Building, on Wisconsin street, corner of East Water street, is the most monumental in Milwaukee, with a picturesque tower suggestive of the towers at Ghent and Lille, but entirely different in detail. The general treatment is a modification of the Rich-

ardson Romanesque, and the design is very original. It is by the late S. S. Beman of Chicago and it can truly be said that it shows more artistic effects than any other building in the city. Less effective, however, but still helping greatly in the sky line of the city, is the tower of the new City Hall, also by Mr. Koch. I say the "tower," because as generally seen from the south the building, which is not very large, is almost entirely concealed by it. It is on a wedge-shaped or flat-iron lot formerly occupied by a market, on East Water street. The details are modified Romanesque.

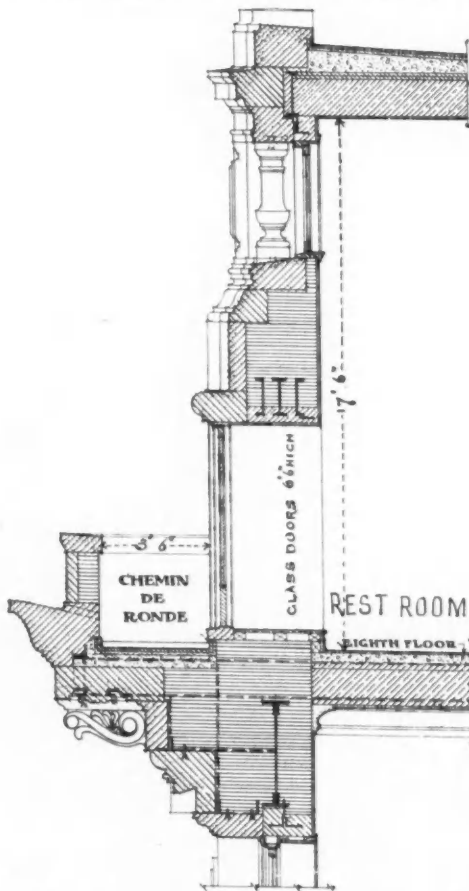
The First National Bank, erected within the present century, is at the corner of East Water and Mason streets, and also has a front on the river. It is sixteen stories high and, seen among the surrounding buildings of moderate height, it looks as if it might be higher than that until one counts the stories. But its height is emphasized by the squareness at the top and the monotony of the upper walls; and as a whole it can only be said that this building is a brutal offense to the sky line of Milwaukee, which has been so much beautified by many of the buildings just named, rearing its great square plain brick walls, filled with small windows of uniform size in ten of its stories, above everything else in sight. This monstrosity is only redeemed by the admirable design for the terrace along the river side, which is a model for what might be the treatment of other buildings on the water front. The French Renaissance design of the first two stories of the building is admirably handled and the interior is a model of convenience and good arrangement for business. The building is quite new, and is the last addition to the monumental architecture of Milwaukee before the erection of the present new structure of the Northwestern Mutual Life Insurance Company. It is the work of Graham, Burnham & Co., of Chicago.

The above mentioned structures and many others that might be mentioned are evidences of great public spirit on the part of men of wealth whose for-

tunes were made in Milwaukee, and who have practically given back to its citizens a good part of what once came from them, in the form of monumental works for the gratification of their eyes and the glory of their city. For it can hardly be claimed that they have been erected altogether for profitable investment.

And not only have the wealthy men of Milwaukee contributed to its advancement, but in a measure tribute has for many years been rendered by the people of the Middle West as well as the whole country through the medium of its greatest financial institution. The Northwestern Mutual Life Insurance Company has had its home office there for more than half a century. Organized originally at Janesville, Wisconsin, in 1857, as a mutual company without a cent of capital, where it was obliged to borrow money for its office expenses the first year, on the personal credit of its trustees, its home office was moved to Milwaukee in 1859, and its assets were then only \$9,335. It has only had three presidents from 1869 up to the present time; John H. Van Dyke from that date to 1874, Henry L. Palmer from 1874 to 1908, and George C. Markham from that date to the present time. Its assets have increased from the above mentioned sum until in 1915 they were \$343,631,110, and there were of members 548,762, which is more than the present population of Milwaukee. What it has done for architecture in the city of Milwaukee is seen in three buildings still standing, the last of which is the main subject of this record. As stated by James G. Jenkins at the dedication of this structure (I quote from his address): "In 1870 it moved into its first office building erected by and for it, on the northwest corner of Broadway and Wisconsin street, now known as the 'Old Insurance Building' or the 'Free Press Building.' In 1886 it removed to the building constructed for it on the site of the ill-fated Newhall House, on the northwest corner of Broadway and Michigan street, which it occupied until its removal to the present structure, during the month of October, 1914." The "Old Insurance Building" is still stand-

ing and is occupied by insurance offices with stores on the first floor. It is a curious specimen of the early architecture of Milwaukee, as it was erected several years before the Board of Trade. It is the work of E. Townsend Mix, the pioneer architect of Milwaukee. In style



DETAIL OF MAIN CORNICE—NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY'S BUILDING, MILWAUKEE, WIS.

it is a sort of nondescript Gothic; but it is still a prominent monument and is too valuable to be torn down even on such a prominent corner. The walls are built of rock face rubble-work, trimmed with white limestone, and it is adorned with some polished granite columns.

The second building the Company erected, still belonging to the Company, built of granite in the style introduced by

the great Richardson, is the work of the late S. S. Beman of Chicago. It was erected in 1886, and is contemporaneous with the Government Building. It was only abandoned two years ago because it was not large enough for the business of the Company, and is now rented as an office building, and known as No. 373 Broadway. It is still one of the valuable architectural features of Milwaukee.

The building which forms the main subject of this article is on the north side of Wisconsin street, occupying the whole frontage from Van Buren street on the west to Cass street on the east. The width of the block is 254 feet 4 inches on Wisconsin street, and the Company owns the entire block from Wisconsin north to Mason street, a distance of 360 feet. The width of the building as erected is 234 feet on Wisconsin street and the depth of the frontage on the two side streets is 279 feet 7 inches. The court on the north side is 79 feet 8 inches by 107 feet 5 inches. The north end of the block is still occupied with dwelling houses fronting on Van Buren, Cass and Mason streets, and these will not be disturbed until the business of the Company requires that the office building be extended farther to the north. But it is completely finished all around the four sides now, the same materials and details of ornamentation being employed everywhere. The only difference noticed is that while the whole exterior is of white granite, the court walls are faced with terra cotta having exactly similar details.

The selection of a new site and the erection of a new building was decided upon in 1910. Marshall & Fox, of Chicago, were selected as architects, designs by other architects having also been considered; ground was broken July 31, 1911, and the corner stone was laid July 17, 1912. It was completed, occupied, and dedicated October 21, 1914. The cost of the land and building (probably including furnishing) as stated by an audit company, was \$3,773,826.48. It may be further pertinent to quote here a sentence from an address by James G. Jenkins at the dedication, as showing the viewpoint of some of those in au-

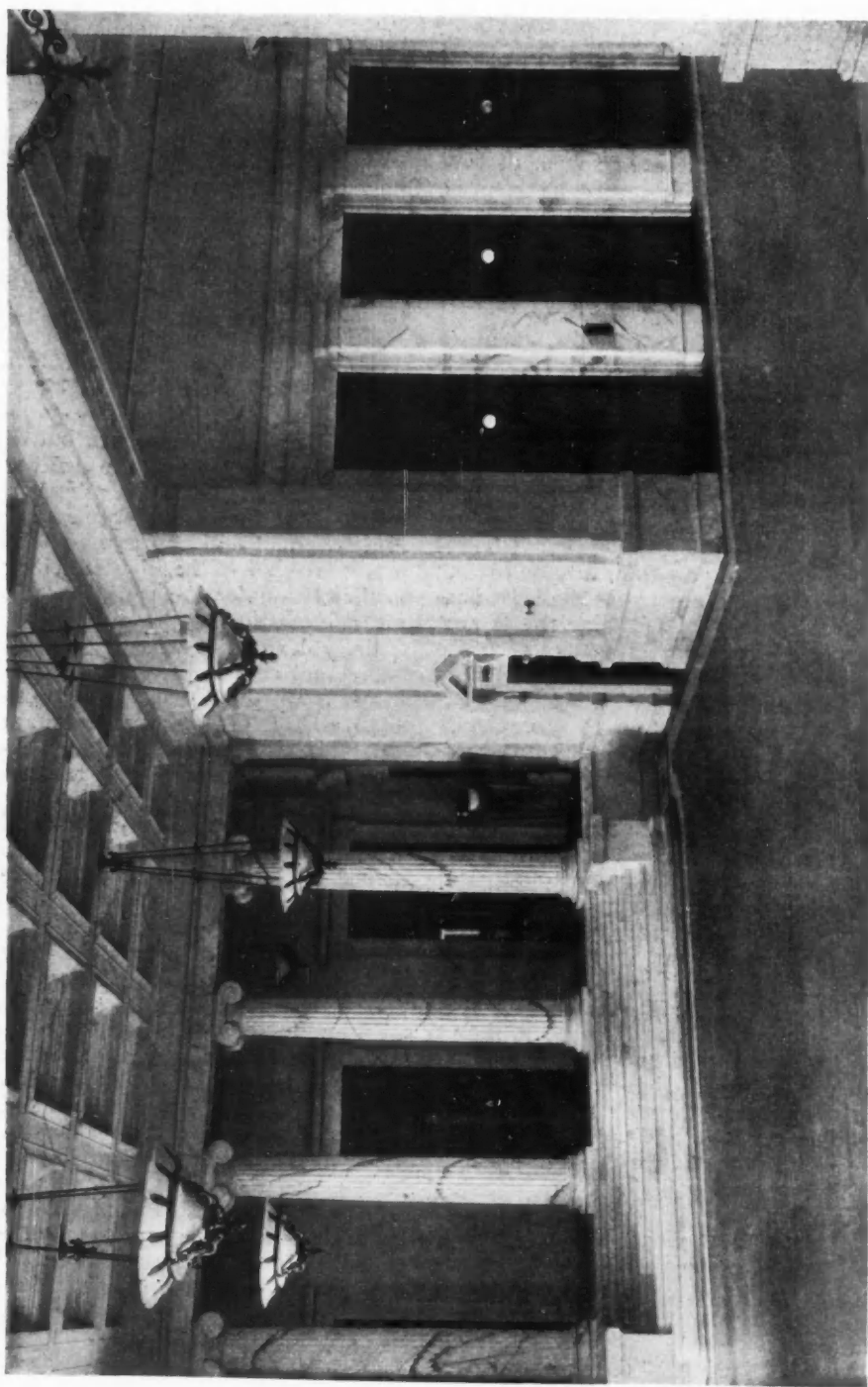
thority in connection with carrying out such great enterprises as this: "The construction was not for the purpose of realizing rentals, and with respect to which the architect was happily at liberty to invoke the beautiful in art, and to so construct it that the most of convenience and comfort may be insured, both with respect to the despatch of business and to the health and comfort of its occupants." The following quotation from the same address will give some indication of the appreciation by a typical man of business of the difficulties of modern architects in dealing with the obstacles of commercialism: "The architect of today is restricted in the development of the beautiful in art. He can no longer indulge his genius for ornamental beauty and grace of design, but is compelled by the necessities or the greed of his employer to design a building without respect to beauty or to art; one that may be erected at the least possible cost, and that will give the largest number of square feet of rental space upon a given surface and in a given building."

This article is illustrated so completely that detailed description is hardly necessary. Only three ground plans and one section are given. A basement plan would be interesting to those concerned with scientific equipment, but a proper account of it would be more appropriate to a scientific journal which could afford the requisite space. I say this because of its importance and extent. The plan of the fifth floor is most attractive as being typical of those which are divided into business offices. Besides, it shows the arrangement of rooms for the trustees and the principal officers. The trustees' and committee rooms on this floor are illustrated by additional half tones. The eighth floor is the most interesting of all and will call for more detailed description.

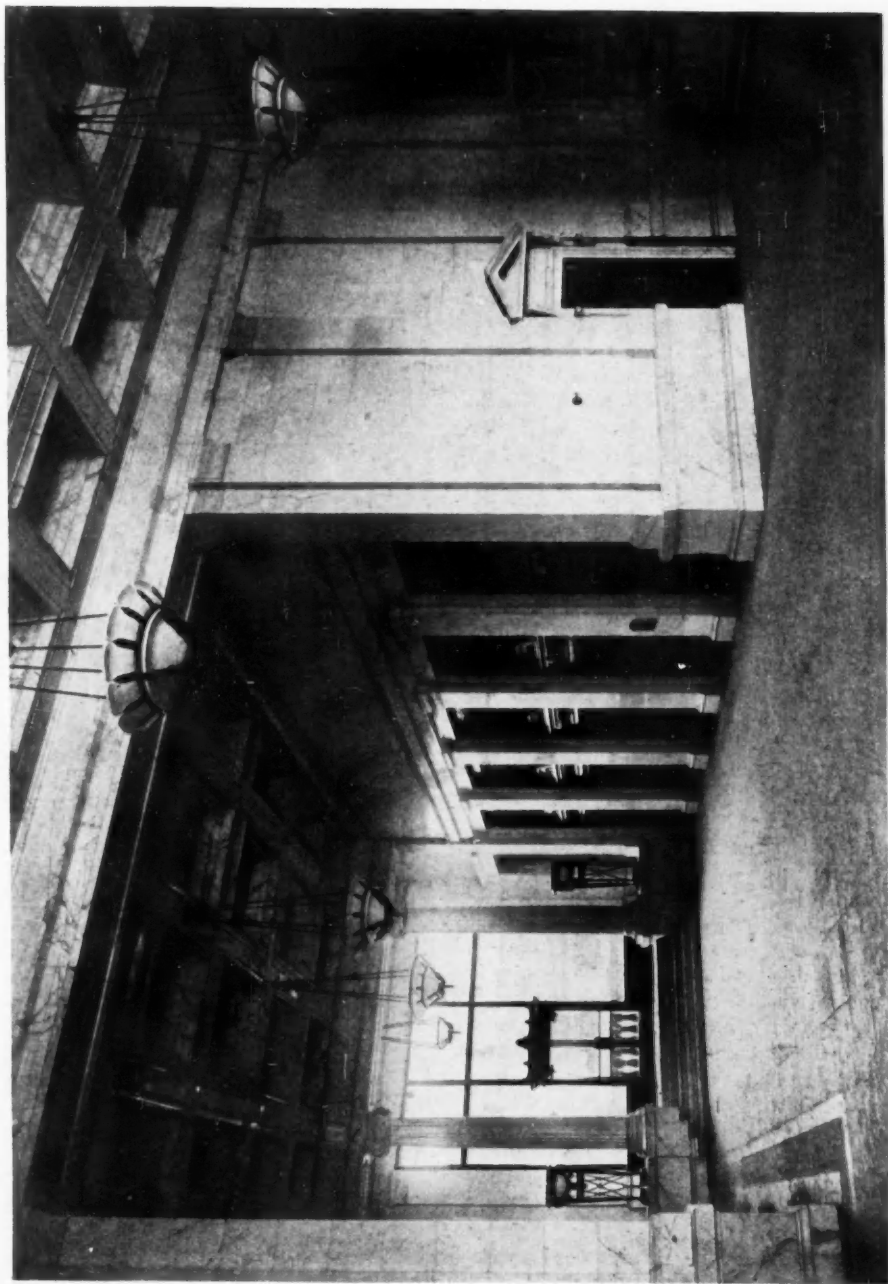
In the general scope of the design I have noticed many things which are exceptional and not conventional. This is one of the largest buildings ever erected that has to provide for only one kind of financial business. There is no part of it for rental or income of any sort.

Furthermore, being solely for financial purposes, there is nowhere in it any large general business office. In this respect it differs from all other insurance buildings ever erected. All the work is divided between separate offices, and the largest room for strictly business purposes in the trustees' room, which is large only because there is a very numerous body of trustees. Another peculiarity of the building is that, notwithstanding its spacious halls and extensive elevator equipment, very few persons comparatively have occasion to visit it. To a casual visitor the halls look deserted. The seven hundred clerks are invisible because they are scattered through hundreds of rooms, but the six elevators are all called into use when at certain times they leave these rooms nearly all at once. The business is really done by mail and express. The eighth story, which has the highest ceiling and is directly under the roof, is really the most interesting to the visitor, for it is entirely devoted to what might be called "accessory conveniences." Absolutely no business of the Company is transacted on this floor. All who go there are actually away from the business and go there for that reason—and furthermore everybody employed in the building has occasion to go to this floor. It will therefore be seen that as this building is designed for the workers and there are few visitors, the workers have had the main consideration in its design.

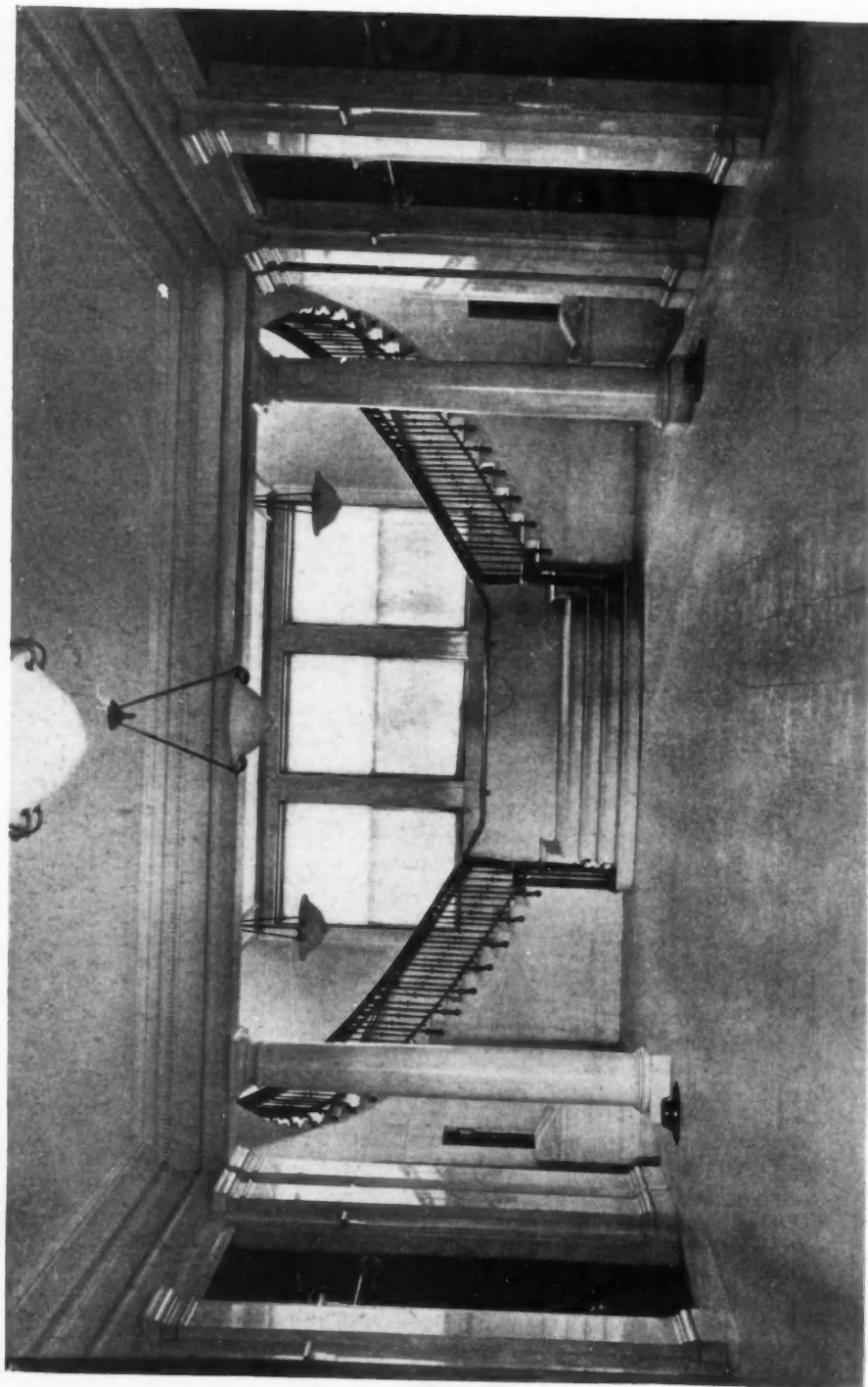
It was necessary to have six passenger elevators to take the 700 workers to their rooms, because they all arrive at nearly the same time. It was also necessary to have equal facilities to take them to dinner at the top of the building, for all are dined at the expense of the Company; and to take them down again. The actual work of the Company is done by the two rear elevators and they are working all day and inaccessible to visitors. It is also necessary to take the 700 employees down again at the end of the day, for they all leave at about the same time. In every respect this is entirely an office building, but for one business only. Still it has an admirable plan for a high class office building rented to tenants



ELEVATOR LOBBY ON FIRST FLOOR, LOOKING
NORTHWEST—NORTHWESTERN MUTUAL LIFE IN-
SURANCE COMPANY'S BUILDING, MILWAUKEE, WIS.



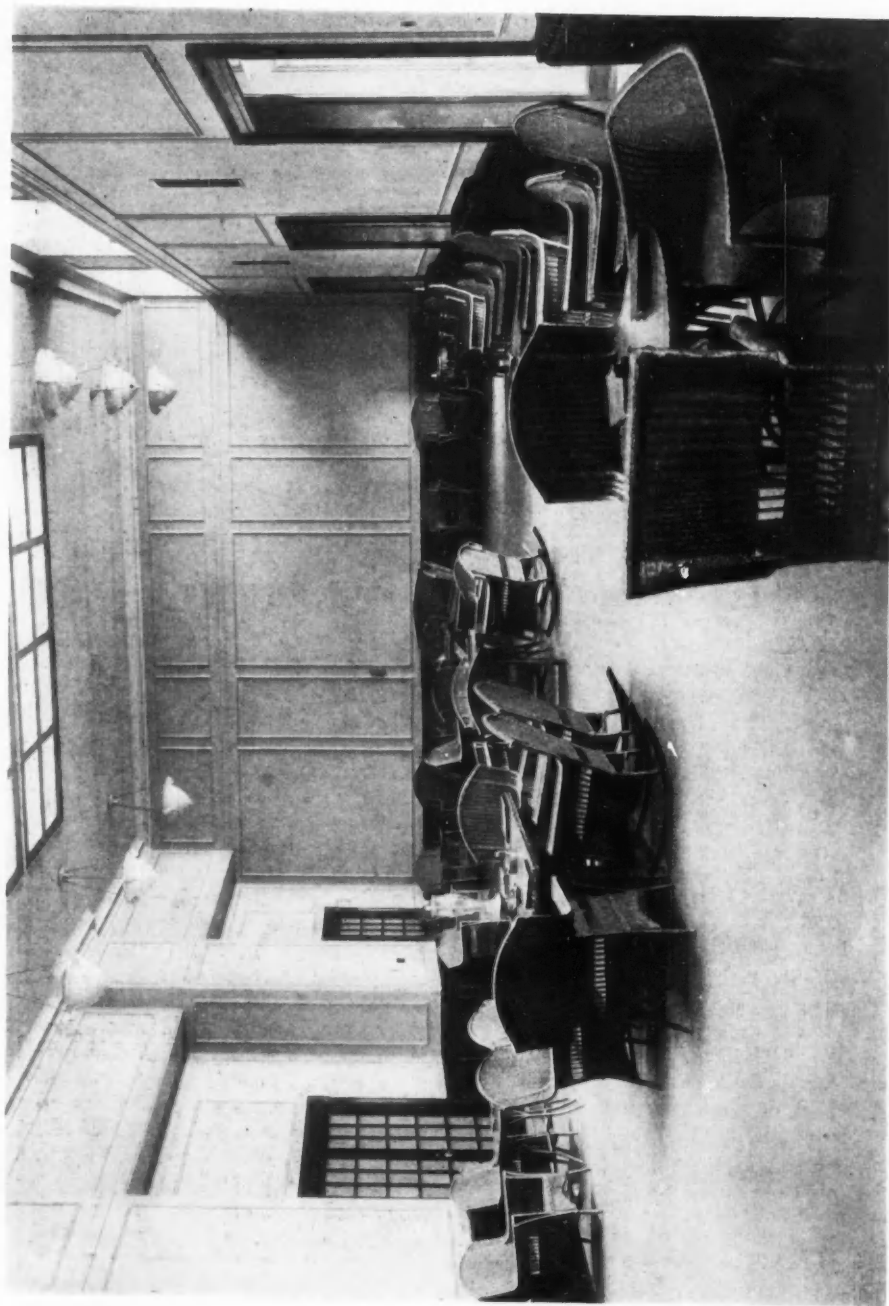
ELEVATOR LOBBY ON FIRST FLOOR, LOOKING
NORTHEAST-NORTHWESTERN MUTUAL LIFE IN-
SURANCE COMPANY'S BUILDING, MILWAUKEE, WIS.



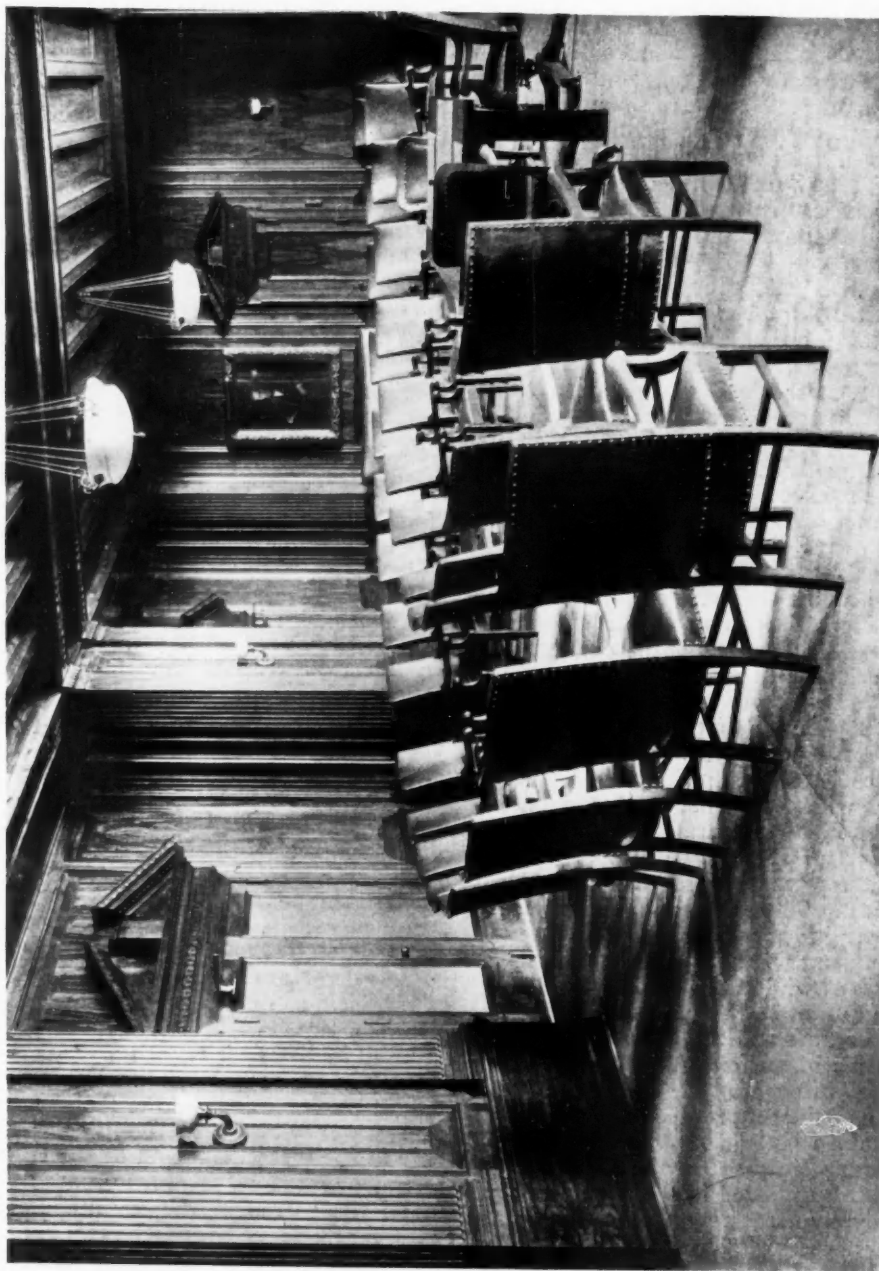
ELEVATOR LOBBY ON SECOND FLOOR—NORTHWESTERN MUTUAL
LIFE INSURANCE COMPANY'S BUILDING, MILWAUKEE, WIS.



AUDITORIUM FOR AGENTS' SEMI-ANNUAL MEET-
INGS.—NORTHWESTERN MUTUAL LIFE INSUR-
ANCE COMPANY'S BUILDING, MILWAUKEE, WIS.



REST ROOM—NORTHWESTERN MUTUAL LIFE INSURANCE COMPANY'S BUILDING, MILWAUKEE, WIS.



TRUSTEES' MEETING ROOM—NORTHWESTERN MUTUAL LIFE
INSURANCE COMPANY'S BUILDING, MILWAUKEE, WIS.

and could be so used without any alteration, including the admirable kitchen and dining room arrangements in the eighth story. There are some novel and interesting features in this eighth story. The ceilings of nearly all the compartments are 17 feet 6 inches high, and there is no attic. Advantage has been taken of the fireproof roof to build it exactly as a fireproof floor, which is heat proof as well as cold proof, and to grade it up with a non-conducting filling to obtain the proper grades to discharge rain water to internal conductors. The roof is built at the level of the upper member of the granite balustrade which surrounds the entire building. Sashes are placed inside of the balustrade and these rooms receive most of their light through the intervals of this balustrade, and in some of the rooms where there are skylights they do not seem to be necessary. These rooms also have sash doors in the outside walls opening upon a *chemin de ronde* which surrounds the entire building including the court. The huge Corinthian cornice is not filled in, but the granite *plancher* of the cornice supports a tiled floor and the parapet of the cornice encloses this promenade 3 feet 6 inches wide. It is not used as a gutter, but has its own separate drainage. Only the tops of the glass doors are visible from the street at a distance of more than 200 feet. There is absolutely no waste of room in carrying out the details of a Corinthian cornice, and an enormous amount of weight has been saved. These doors can all be thrown open during the summer time and the cool breezes from Lake Michigan, only two blocks away, can play through all the rooms, while the most magnificent prospect over the water is obtained both in summer and winter.

Another feature of the exterior design is also utilized in the seventh story. By slightly enlarging the height of the main frieze, windows are inserted in their natural positions with reference to the rooms, and all the rooms in the seventh story are lighted in this way.

The plan of the eighth story shows the auditorium, with seats for about 800. It was planned primarily for the semi-annual meetings of all the agents of

the Company, but can be used for other purposes. It is also lighted through the balustrade immediately under the edge of the roof. The other principal rooms are the rest room, a social meeting room for all the employees, and dining rooms for the men, the women, and the officers; an important room being the perfectly appointed kitchen.

Thus far nothing has been said of the architecture of this great building. Those who know the writer must be aware that he is not an advocate of the revival of classical architecture in the twentieth century. Yet there is something so truthful as concerns its general treatment, plan and execution, and so sincere in the chaste revival of classical and especially Roman details, both on its exterior and in its interior, that it cannot escape profound admiration.* It certainly is a monumental building so far as concerns its reproduction of the essential elements of the best developed architecture of Rome, yet it is in no respect, notwithstanding its massive proportions, a reflection of Roman construction. On the contrary it is an example of all the modern engineering expedients in building construction which have distinguished the building art of the last forty years in this country. If the designs and arts of the Romans can be consistently revived in concert with modern engineering devices, this building demonstrates it, as no other that I know of can. That is the whole story. If anything better can be done on such a large scale, time alone will solve the problem.

In all its details it reveals a very careful study of ancient art unmixed with any of the inventions of the Renaissance period. It violates classic proportions only in enlarging the height of the frieze by utilizing it so as to afford proper light to all the rooms in the seventh story. This seems to be justified by practical expediency. In execution it has eliminated much of the heavy materials hitherto used in the application of classical architecture to modern uses on a great scale.

*There are several others in Milwaukee showing excellent classical design.

CHURCH PLANNING IN THE UNITED STATES

Its Growth and Adaptation to Present Needs. With Special Reference to the Development of the Denominational Plan

By Richard Franz Bach

PART II.

RETURNING to the question of the altar and the pulpit, we find that in the denominational building the congregation looks up not to the altar which, if present at all, may appear upon their own floor level, together with the communion table, but to the minister in the pulpit, as the logical keystone of the service, in fact, as the representative of the church; for the reduction of ritual in which worshippers take part, even though only in observation, has inversely encouraged the increase in value attributed to the minister's share of the service, during which the congregation is idle and in passive state of mind. Hence the exaltation of the sermon to the point of greatest importance, so that in the eyes of the average worshipper it has completely dwarfed the rest of the ceremony, which he is apt to consider unnecessary. All of this modification brings with it certain arbitrary demands which will automatically limit the size of the plan under average conditions. In the first place the pulpit must be so located, the plan so arranged, and the structure so built, that the minister shall be readily heard and easily visible. This implies the elimination of supports which obstruct the view and impede hearing, and results in a general arrangement on the basis of a rectangular hall (Figs. 6, 7, 8, 9, 21), often approaching an oval (Fig. 12) or an octagon in plan (Figs. 11, 13, 14), and of such dimensions that the normal voice will carry to all parts of the interior providing seating accom-

modations. The splendid vistas of the old cathedral nave, aisles and transept are impossible; likewise the quality of perspective and line harmony obtained by duplicating the verticals of supporting masses. An interesting result of a combination of old and new tendencies is seen in the plan of Greek cross type (Figs. 15, 16, 17, 18, 19, 29), which suggests a denominational modification of the liturgic Latin cross plan and should not be in any way connected with historical Byzantine plan indications.

The pulpit appears at the middle of one side, later frequently in one corner, and is placed on or near a platform, which represents the old east end but offers none of its glamor or architectural possibilities (Fig. 10). The audience hall presently is much improved by the advance in the science of acoustics; its floor is permitted to slope, or is given a shallow bowl-like curvature, like that of a theatre, to improve the view, and its shape is occasionally altered for the same reason. The hall is limited in size also by the difficulties of construction, the possible span of roof trusses; in this field, of course, the early builders had not the advantage of modern steel and vaulting methods. As a whole, then, the plan offers what seems at first a much less interesting problem than that of a church building for a ritual faith, until we have witnessed the rapid growth of the influence of the denominational church in community life, in educational work, both practical and religious, as

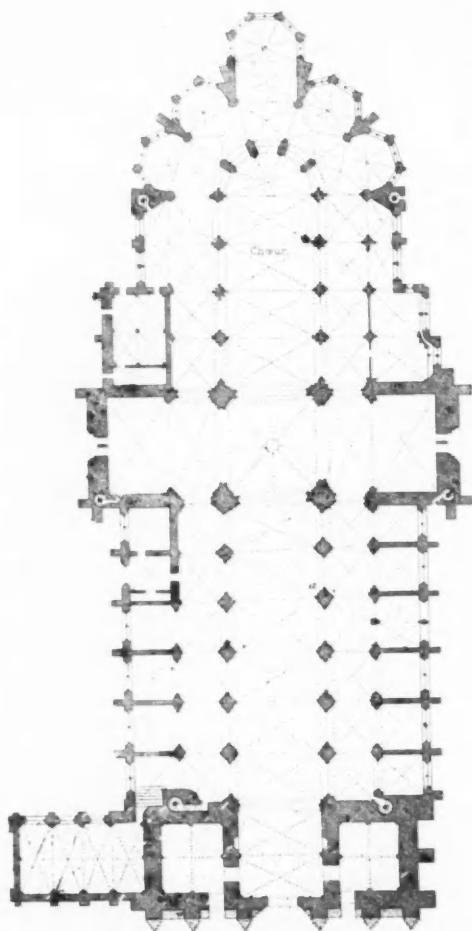


FIG. 1. TRADITIONAL PLAN. NOTRE DAME DE BAYEUX, DATING FROM 1046-1077.

well as in numerous other fields. All of these make new demands upon a building type originally conceived for the restricted purposes of dispensing religion, the remainder of its effect upon daily life being considered extramural, so far as the use of the church edifice itself was concerned. One by one the new demands are incorporated in the plan, which, traditionally unhampered, accords itself to each in turn. In fact, the effect of the Sunday School alone assumes such magnitude in the consideration of church planning that the disposition of the entire building is frequently dependent upon its importance. This will be indicated in detail in our study of Sun-

day School plans in subsequent papers. Since the variations and additional requirements crowd upon one another within a limited period of years, the plan remains in a state of flux, rapidly adjusting itself but achieving no definitive form of its own representing the best solution of variegated modern churchly needs. At the moment several decided efforts on the part of architects and ministers alike have resulted in a general formulation of ecclesiastic needs on the basis of the widest civic influence of the church building and undoubtedly the near future will see remarkable progress in planning as well as in design along these lines.

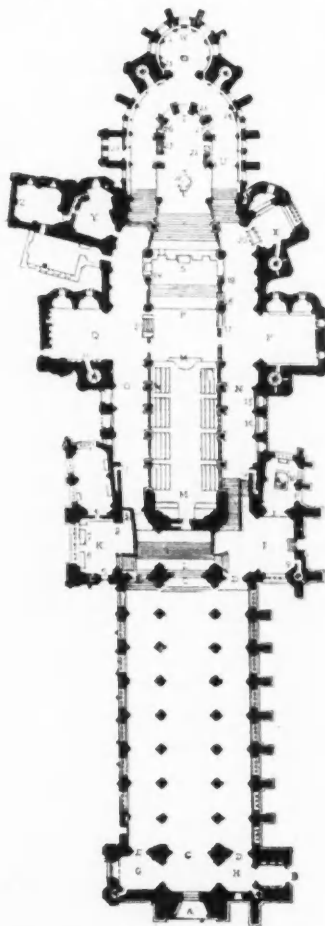


FIG. 2. TRADITIONAL PLAN. CANTERBURY CATHEDRAL, DATING FROM 1070-1500.

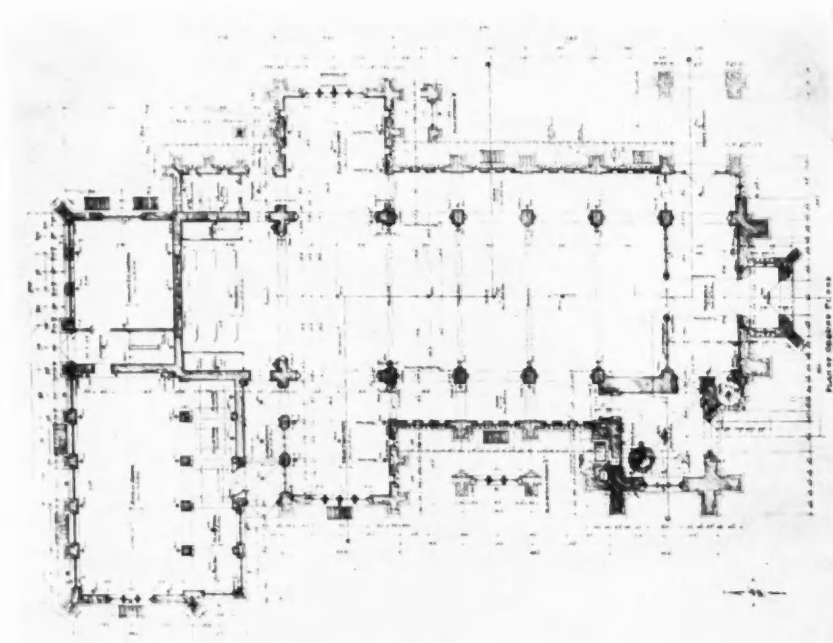


FIG. 3. FIRST PRESBYTERIAN CHURCH, SYRACUSE, N. Y. MODERN TRADITIONAL PLAN.
Tracy & Swartwout and Ballantyne & Evans, Associate Architects.

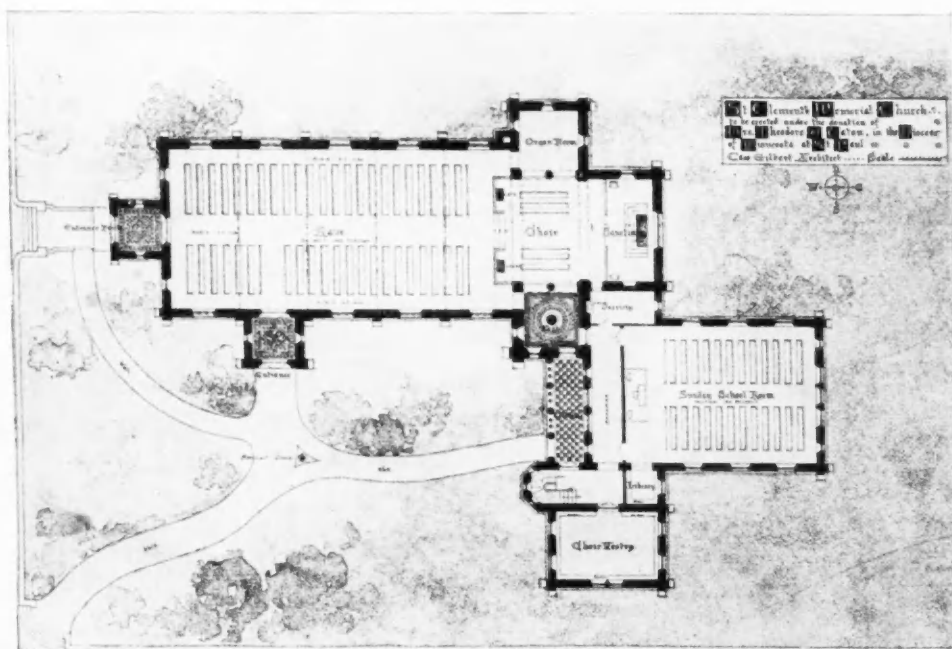


FIG. 4. ST. CLEMENT'S MEMORIAL CHURCH, ST. PAUL, MINN. MODERN TRADITIONAL PLAN.
Cass Gilbert, Architect.

The denominational building presented for many years serious difficulties in design both within and without, which though not insuperable, were rather less

munities during the whole of the last century. Again, the denominational plan favors squareness and compactness, only occasionally achieving any decided length,

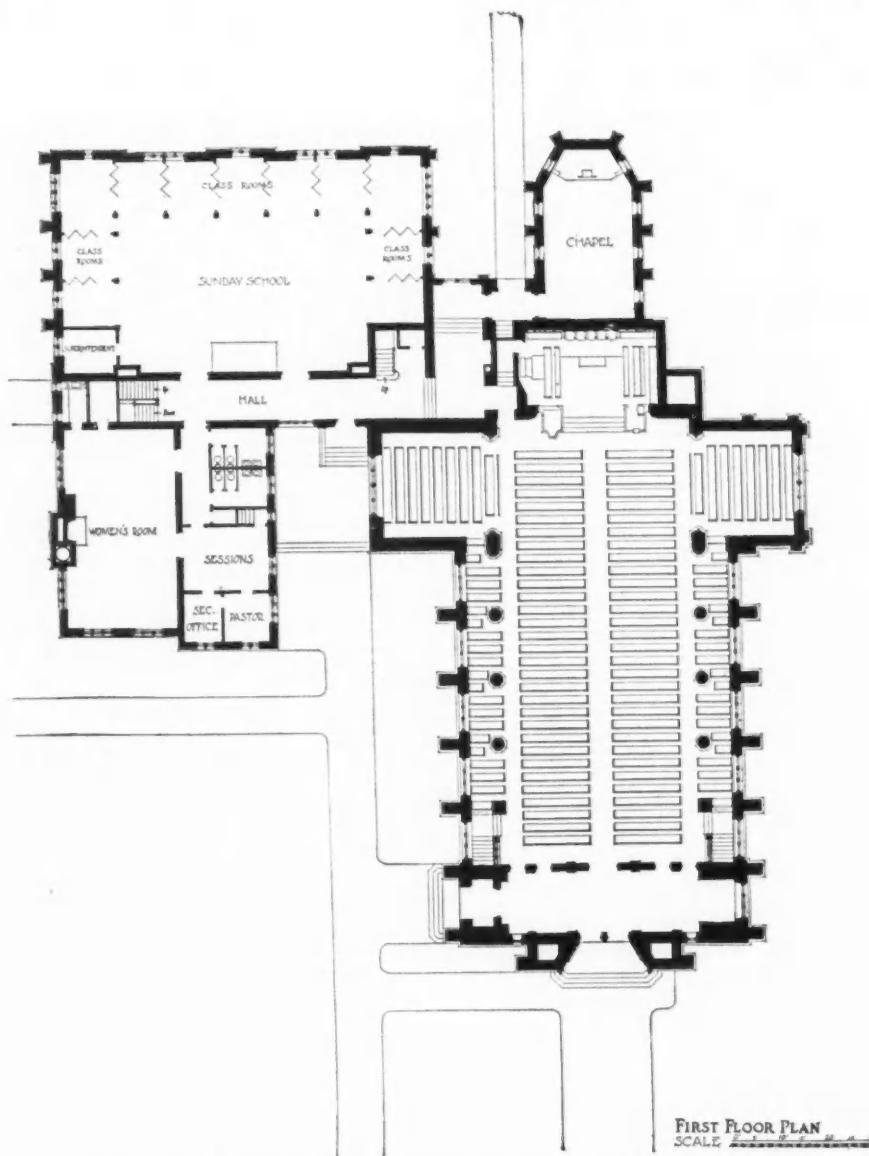


FIG. 5. THE HOUSE OF HOPE PRESBYTERIAN CHURCH, ST. PAUL, MINN.
MODERN TRADITIONAL PLAN.
Cram & Ferguson, Architects.

attractive in the solution, especially in view of the limited architectural ability at the disposal of our smaller com-

—with the exception of a number of the more recent examples—and subject to the limit of audibility of the average

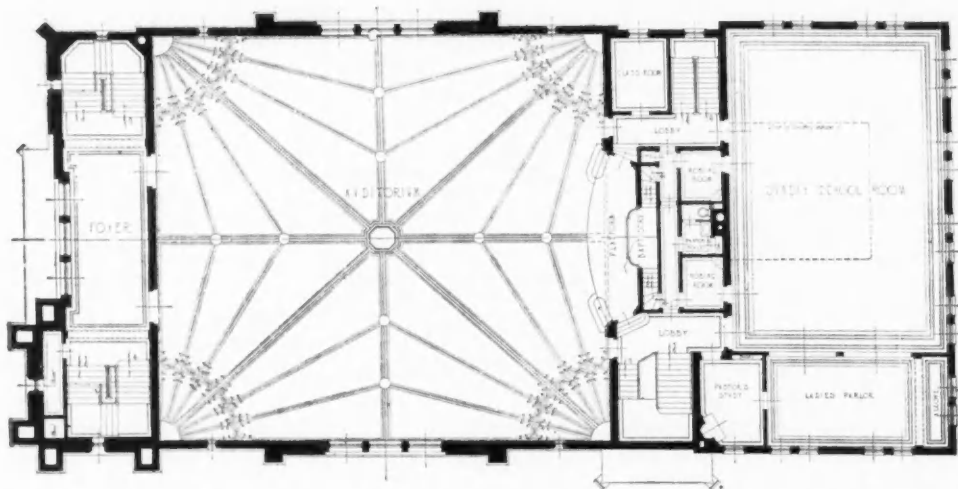


FIG. 6. HIGHLAND BAPTIST CHURCH, SPRINGFIELD, MASS. RECTANGULAR AUDIENCE HALL PLAN.

Kirby, Petit and Green, Architects.

voice, which is usually considered between sixty-five and seventy-five feet. It rarely offers the fertile opportunities of buttresses, pinnacles and many other details in the exterior characteristic of medieval picturesqueness, and, with the exception of derivatives of the English Renaissance style, and due more especially to difficulties already mentioned, it finds but little encouragement in that prolific field of design. In great degree, likewise, the beauties of pier and arcade and triforium within are practically

eliminated, not to mention the inviting province of choir and apse as a special feature.

Thus the history of the church plan in this country as expressing the newer denominational purpose is fraught with many handicaps. Still, in the face of the two-fold obstacle of lack of creed concentration—accompanied by an extremely rapid internal development of each creed subdivision—and of recognized stylistic or plan concentration—hampered still further by the defection

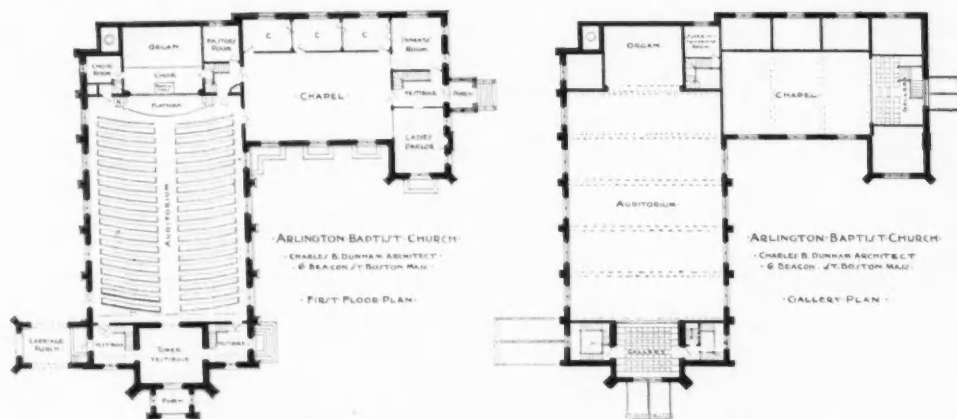


FIG. 7. ARLINGTON BAPTIST CHURCH, ARLINGTON, MASS. RECTANGULAR AUDIENCE HALL PLAN, PULPIT ACROSS SHORT END, TRADITIONAL SUGGESTION.

Charles B. Denham, Architect.

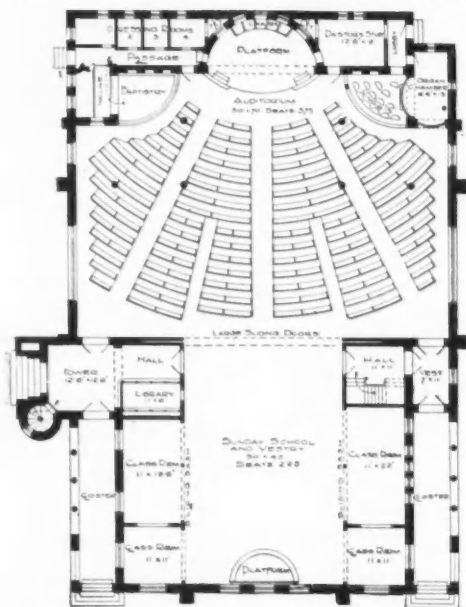


FIG. 8. FIRST BAPTIST CHURCH, COLORADO SPRINGS, COLO. RECTANGULAR AUDIENCE HALL PLAN, PULPIT MIDDLE OF LONGER SIDE.

L. B. Valk & Son, Architects.

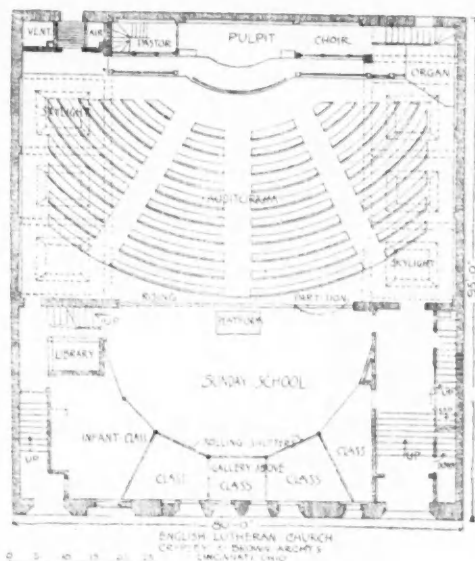


FIG. 9. ENGLISH LUTHERAN CHURCH, CINCINNATI, OHIO. RECTANGULAR AUDIENCE HALL PLAN.

Crapsey & Brown, Architects.

of architectural ability as well as by the great size of the country and disparate local influences due to parallel Colonial

beginnings on the part of a number of races—it has succeeded nevertheless in attaining at least a certain definition of

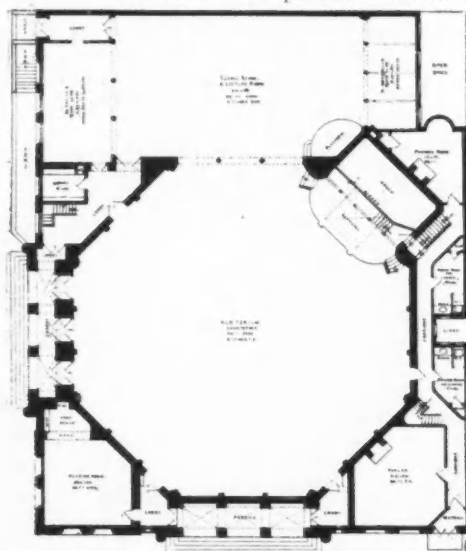


FIG. 10. FIRST PRESBYTERIAN CHURCH, QUINCY, MASS. RECTANGULAR AUDIENCE HALL PLAN, CORNER PULPIT.

L. B. Valk & Son, Architects.

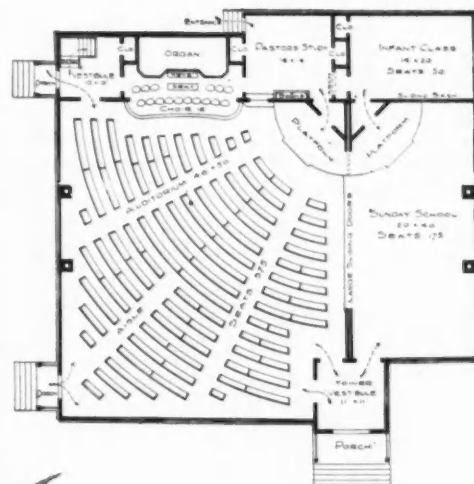


FIG. 11. FIRST BAPTIST CHURCH (COMPETITIVE DESIGN), NEW YORK CITY. OCTAGONAL AUDIENCE HALL PLAN.

Oscar S. Teale, Architect.

church purposes, and has in most recent years been glad to recognize the ascendancy of architectural skill in design and in plan if only these purposes be adequately met.

These denominational requirements resolve themselves chiefly into a plan arrangement involving, first an audience hall of such proportions and construction as to abet both hearing and vision, and second a region generally designated as

changes of raiment for the purposes of baptism.

The audience hall was subject to no further modification, unless it be that of increase in size to accommodate the Sunday School—as will be demonstrated in the course of the next paper in this series—either on the same level or in galleries also available for regular church services. In this connection minor plan differences might be brought about. It

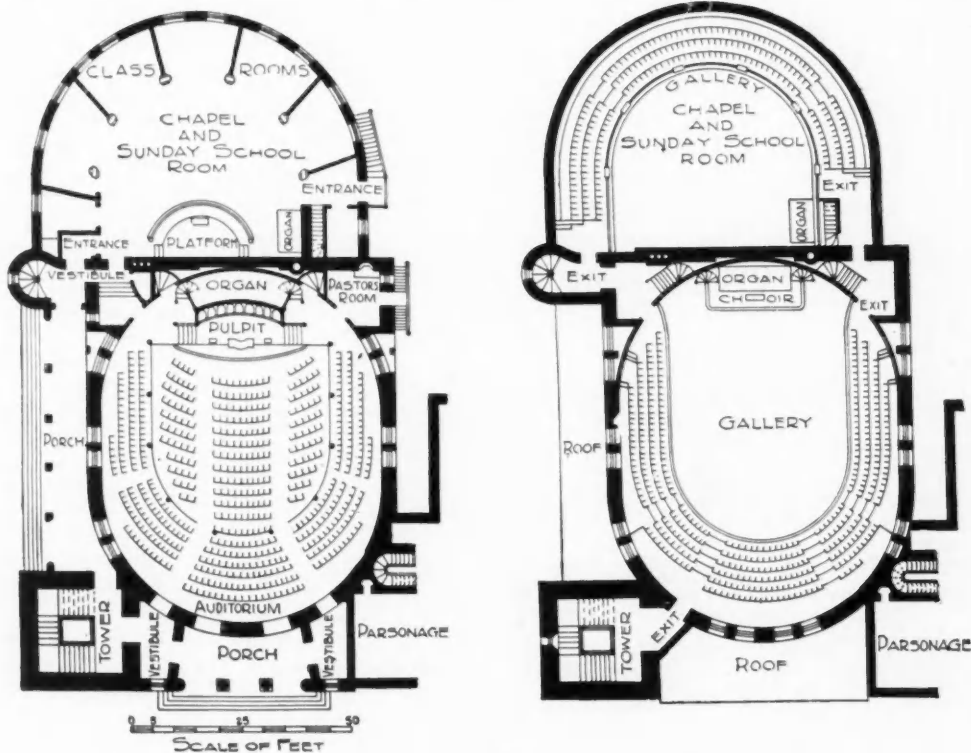


FIG. 12. FIRST M. E. CHURCH, BALTIMORE, MD. OVAL AUDIENCE HALL PLAN.
McKim, Mead & White, Architects.

the chancel or, in common parlance, "the platform," the latter usually including the platform proper, the pulpit, an organ space or gallery, a choir loft, and such additional space reservations as might be necessary for the use of minister or choir before and after services, or for waiting and robing rooms in the case of those denominations which prescribe a certain costume for these participants during the service, or which require

is interesting to observe in recent years, as a result of the splendid Gothicism of the firm of Cram and Ferguson and likewise of that of Mr. Bertram G. Goodhue, that the old elongated plan has become increasingly a subject of study and variation to satisfy modern denominational needs. Acoustically this has decided advantages.

Finally there remain also the accidental, but obligatory, variations of plan

attendant solely upon the dimensions and levels of available land (Fig. 20); the solutions of such individual problems have within the last ten or fifteen years evidenced an ingenuity and understanding that augur well for ecclesiological progress in this country, for they assure us that our architects are equipped to grasp the utmost potential value of as well as the limitations imposed by immutable conditions.

The Entrance.

The entrance to the church in time achieves greater importance; we find it expanded occasionally into the form of a projecting porch (Figs. 4, 29), perhaps with stairway approaches and walks; we find it also increased to the full width of the building to form a portico corresponding to the narthex sanctioned by many centuries (Figs. 21, 22). Finally, modern con-

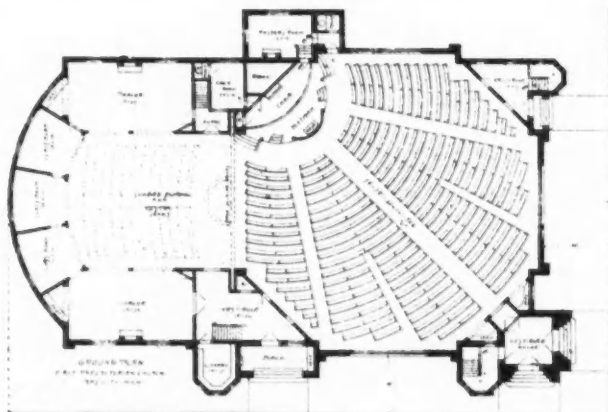


FIG. 13. FIRST PRESBYTERIAN CHURCH, CHATTANOOGA, TENN. OCTAGONAL AUDIENCE HALL PLAN.
Bearden & Forman and McKim, Mead & White, Associate Architects.

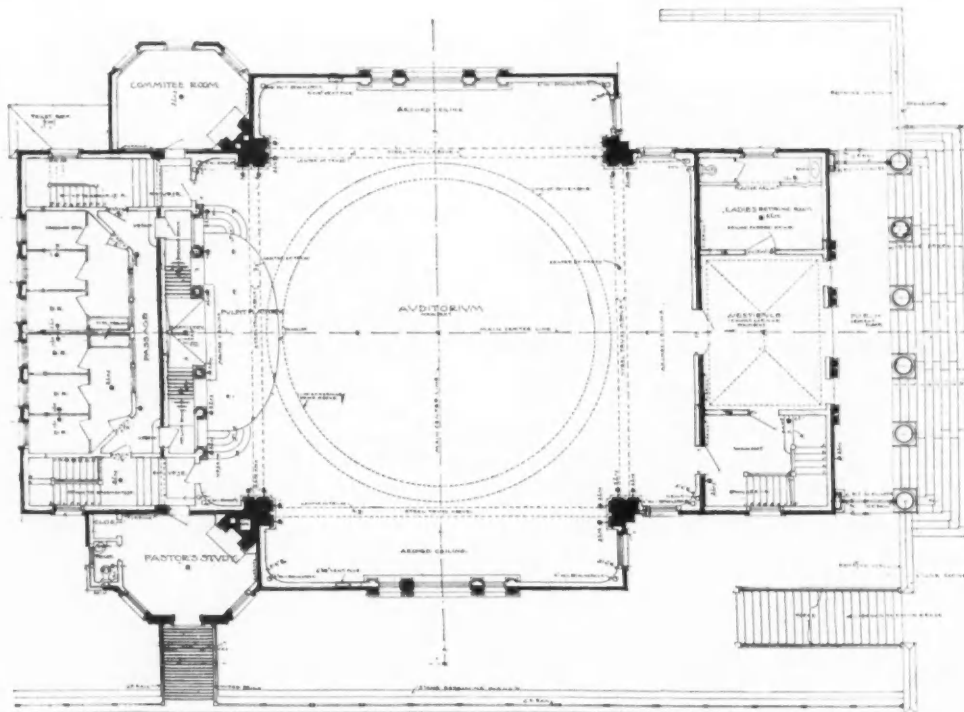
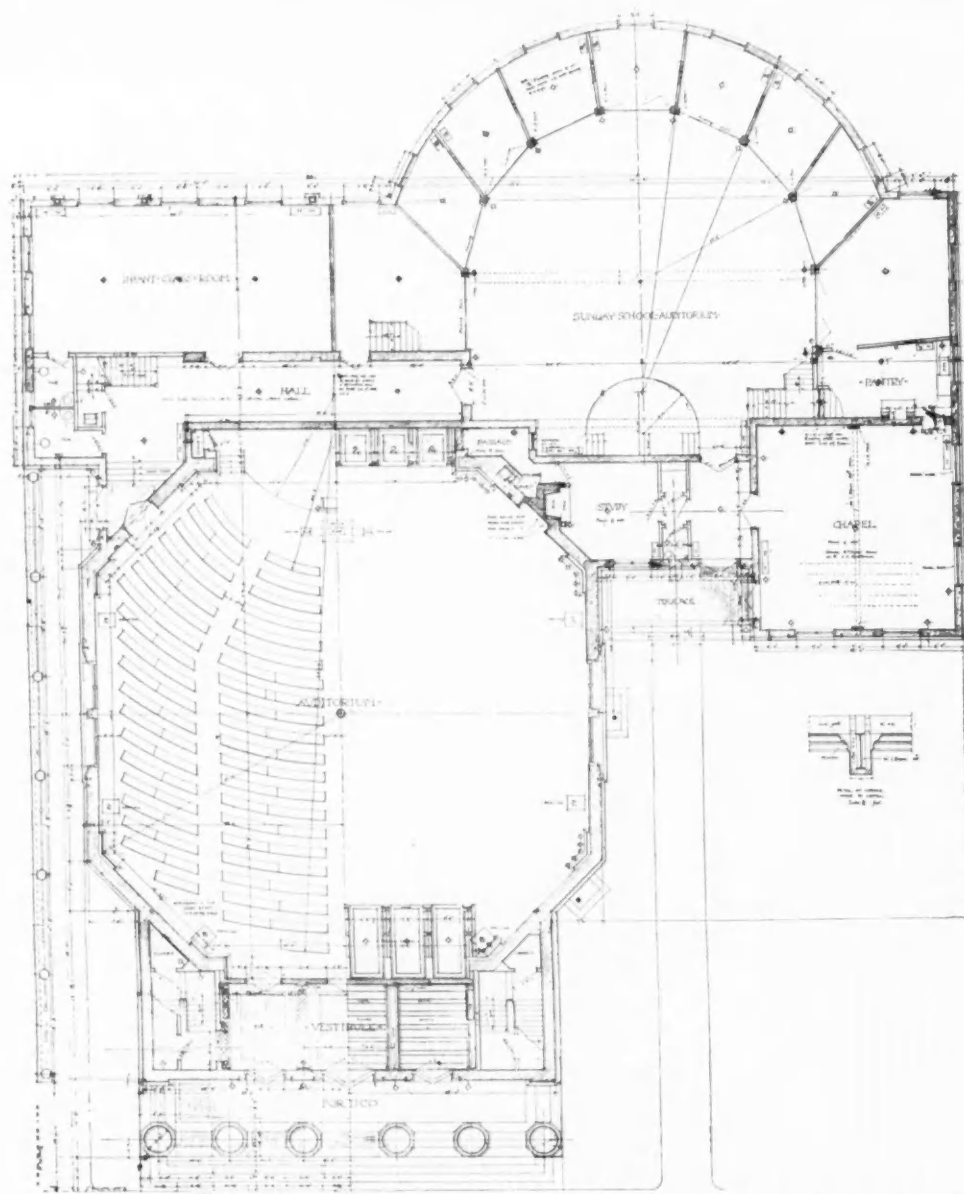


FIG. 14. FIRST PRESBYTERIAN CHURCH, BAY CITY, MICH. OCTAGONAL AUDIENCE HALL PLAN, PULPIT ON DIAGONAL AXIS.
L. B. Valk & Son, Architects.



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FIG. 15. PONCE DE LEON AVENUE BAPTIST CHURCH,
ATLANTA, GA. GREEK CROSS PLAN AUDIENCE
HALL. HARALSON BLECKLEY, ARCHITECT.

venience demands the additional entrance way for those who come in vehicles and this is provided for in the projecting motive of the porte cochère with driveway approaches and separate access to the building or to its portico (Fig. 7). The entrance in general assumes a certain mobility under the spell of the state of flux characterizing the plan. In later buildings, especially in those approaching the present day, the body of the church, notably in examples providing a limited number of sittings, is often left intact and entrance facilities are offered only through the porte cochère or through a separate pro-

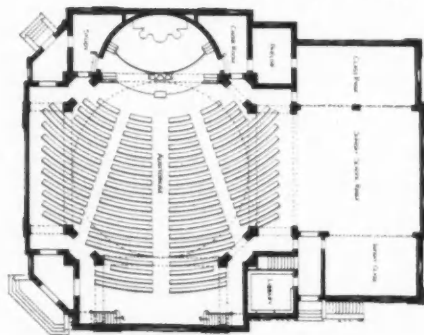


FIG. 16. WEST PRESBYTERIAN CHURCH, BINGHAMTON, N. Y. COMPETITIVE DESIGN. GREEK CROSS AUDIENCE HALL PLAN. H. S. Gardner and A. B. Lawyer, Associate Architects.

jecting entry which flanks an end of the building (Fig. 23). The separate entry is also conceived in numerous cases as a salient motive in the middle of one end of the edifice. But the chief modification of plan at the entrance side of the building is, in the end, the tower.

The Tower.

The tower has come to be regarded by the vast body of incorrigible laymen as the only infallible index of the church edifice; it proclaims a church beneath as surely as the mast signifies a ship. It would be difficult to explain this insistent misconception without carrying our study back again to the fountain source of time worn tradition. At present the tower is one of the most abused features in the whole architectural compass, notably as applied to small church design. Of this any study of the majority

of current examples of church exteriors would offer adequate proof. Nor is the abuse only architectural; the item of cost should also deter the small community from incorporating such an egregious member in the plan. Many expedients have been devised, as will be indicated later, to make best use of available space on the ground and other levels of tower additions.

The object of the tower at the outset was obviously that of raising the bells to a position of sufficient height to facilitate the passage of sound waves over the maximum area. The belfry of the early church in this country served this purpose without resultant modification of plan, while later examples show the tower motive, largely adapted from foreign sources, placed at one end of the building as an entrance and belfry combined. In present practice the larger edifice, serving the ends of a given style of architecture, will make corresponding use of its tower or towers, and, in general, to good advantage; while the smaller church building almost invariably cries aloud to be relieved of the burden of masonry set astride of its ridge or by its end position dwarfing nave and sanctuary into the proportion of penthouses. For the average religious group to-day a vaulting ambition prescribes a heavy, preferably disproportionate mass, such as mars many an otherwise acceptable small church design; the very thought of the new building to be erected implies an ostentatious tower, for this remains the only acceptable symbol of the religious edifice. It is admitted that a fine tower may be an added or even an essential factor in the dignity of a great building, without which the traditions of its existence would seem incomplete and unsatisfactorily met, but the fallacy of assuming that the ecclesiastic character requires tower irrespective of the size of the structure of which it forms part is amply demonstrated by the numerous pathetic efforts to be seen in our smaller towns and villages and to a large extent even in our cities.

But, granted that the tower has been made an accepted feature in exterior de-

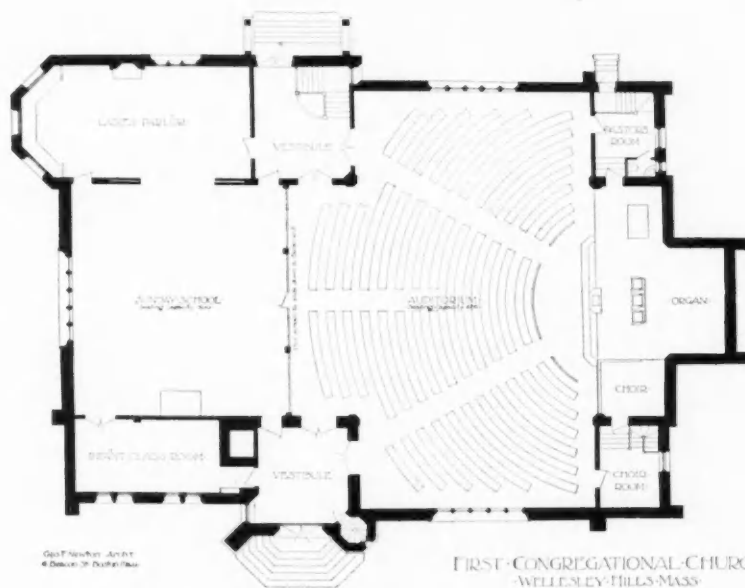


FIG. 17. FIRST CONGREGATIONAL CHURCH, WELLESLEY HILLS, MASS. GREEK CROSS PLAN AUDIENCE HALL.
George F. Newton, Architect.

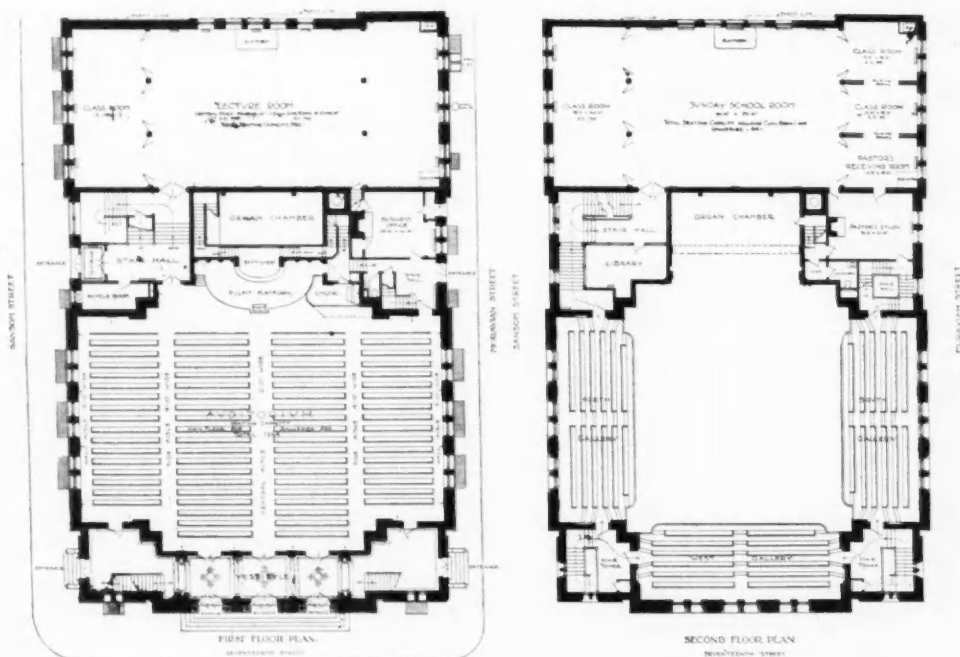


FIG. 18. FIRST BAPTIST CHURCH, PHILADELPHIA, PA. GREEK CROSS AUDIENCE HALL PLAN.
E. V. Seeler, Architect.

sign, its effect on the plan may be that of an additional ground area or that of an incorporated mass. In the former case it may stand at a corner or at the middle of one side (Figs. 12, 24), and entrance may be had to the audience hall through its base (Figs. 7, 25); it might

ground for Renaissance art; on one hand the combination of greater princes against intermediate barons, which brought about a conflict that led to the growth of communities later to be called cities, and on the other hand the favor granted to such cities by the secular clergy and especially by the local bishops. At this time many church towers rose as the only structures of any height in the growing centres of population, and citizens looked to them for warning of danger, fire and the alarm of war, as well as for the call to service. Perhaps this civic significance yet has its hold upon us and will assuredly be strengthened by the steadily increasing scope of the modern

church building in community service. In the second place, then, the tower may figure as an incorporated mass. In

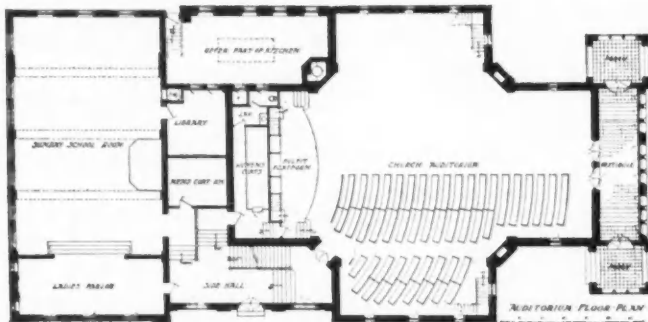


FIG. 19. FIRST UNIVERSALIST CHURCH, ROCHESTER, N. Y.
GREEK CROSS AUDIENCE HALL PLAN.

Claude Bragdon, Architect.

also in such case replace the separate entry mentioned before or serve as a stair-case hall (Figs. 27, 28). It may support a clock and it may contain bells, but although the original purpose of the tower,—or the *campanile*, as it is termed historically,—was assuredly that of the bell-tower, its use in the average church of to-day is by no means demonstrated by the presence of bells in its belfry. In fact the great majority of towers are purely decorative features of a type which has persisted in the minds of men with the effect of the monument rather than that of the building of which it should form an integral part.

So strong is this monumental effect that churches have been removed or destroyed, but their towers have been left as records. We have only to quote the historic example of the Tour St. Jacques in Paris, a relic of the old church of St. Jacques-la-Boucherie, and dating from 1508-22, and the more homely case of the New Brattle Street church in Boston. No doubt much of the significance of the tower dates from that stirring epoch when the feudal system of society was being slowly undermined by the inexorable double-edged force of the new dispensation that was to form a back-

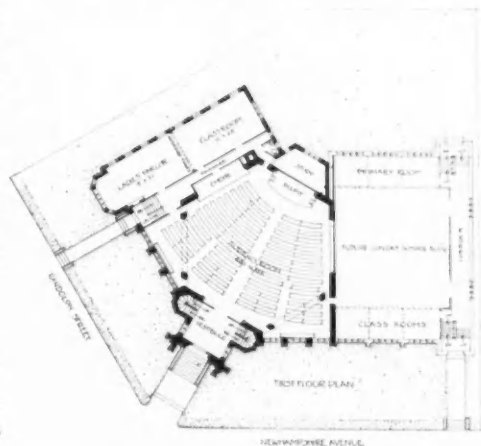


FIG. 20. WALLACE MEMORIAL UNITED PRES-
BYTERIAN CHURCH, WASHINGTON, D. C.
IRREGULAR SEPTAGONAL PLAN, SUG-
GESTED BY EXIGENCIES OF SITE.

Chas. W. Bolton & Son, Architects.

this capacity it may be placed centrally over the crossing of nave and transept, or over one end, but at all events spanning part of the interior (Fig. 29). This

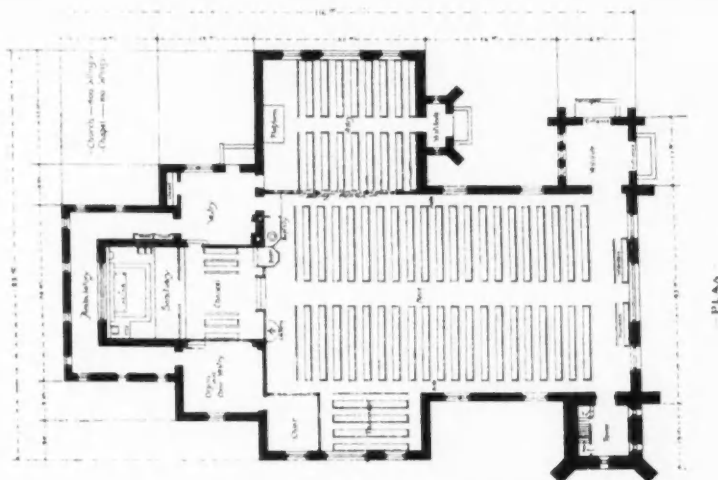


FIG. 23. ST. JOHN'S CHURCH, ONEIDA, N. Y.
Manly N. Cutter, Architect.

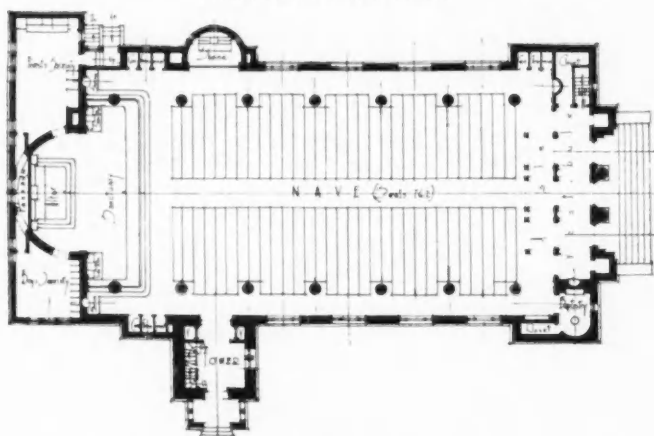


FIG. 22. ST. JOSEPH'S CHURCH, DAYTON, OHIO.
Maginnis & Walsh, Architects.

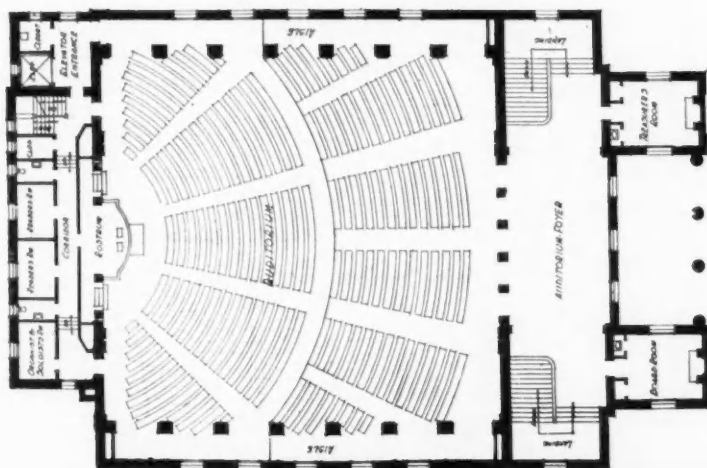


FIG. 21. FIRST CHURCH OF CHRIST SCIENTIST, LONG BEACH, CAL.
SQUARE AUDIENCE HALL PLAN.

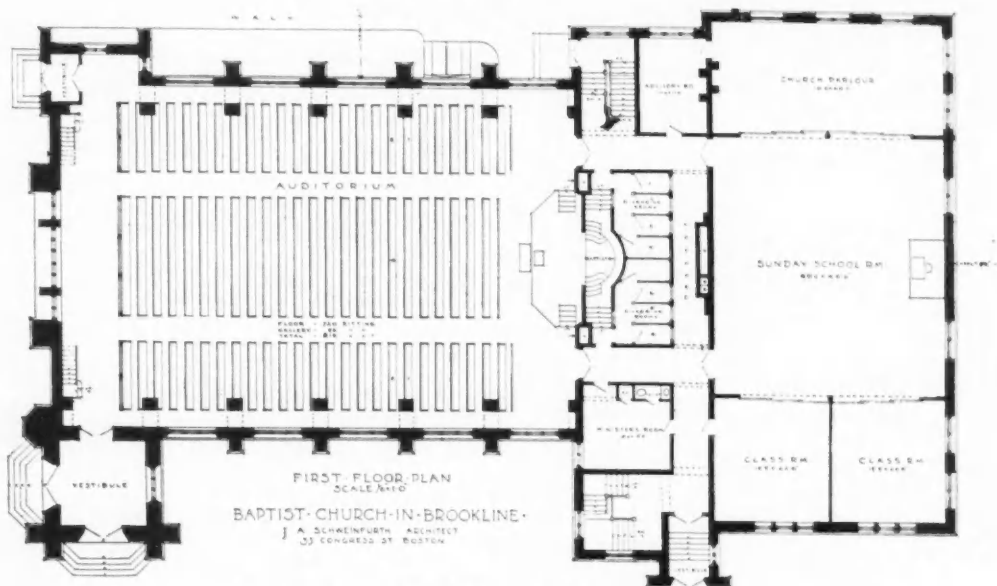


FIG. 24. BAPTIST CHURCH, BROOKLINE, MASS.
J. A. Schweinfurth, Architect.

type of tower is prone to minimize the effect of the main mass of small buildings as seen from without; although the impression within frequently is simply that of a larger open area, with no suggestion of the type of mass covering it. What is more, the construction involved in such an undertaking is apt to prove prohibitive in price under ordinary conditions.

The Chancel.

Considering now the possible variations of the original plan of the church building in accordance with more complex needs at the platform or chancel, we find again the handicap of early meeting house severity. More of the warmth of the ritual sanctuary appeals to us, the appeal being un-

consciously strengthened in those of us who are students of art or of history and for whom, therefore, the individual mem-

bers of the old chancel and its enclosing chevet are replete with the indications of growth and human progress—even though we may not subscribe unreservedly to the ritual type of worship. Provision for an elevation of some sort is inevitably necessary and upon this an unpretentious altar may or may not appear, pursuant to the prescriptions of the denomination in question. The



FIG. 25. CONGREGATIONAL CHURCH, CHARLES CITY, IOWA.
Liebbe, Nourse & Rasmussen, Architects.

pulpit, likewise, is given a place on or beside the platform. A small room or study is usually provided for the minister, and this often balances a similar

room for the organist or the choir or for both; these rooms regularly find place at either side of the platform, obviously to render possible direct access to the platform at the proper moment. (Figs. 6, 8, 15, 27.) Specific conditions, however, may make it necessary to subordinate this requirement to that of circulation facilities, as in the case of denominations requiring the presence of members of the con-

choir at the side of the building or possibly in a gallery above the entrance. These arrangements would not necessarily involve important modifications in plan, nor would the space thus made necessary be of greater dimensions, unless the choir be vested. The separate entrance near the platform would thus also be restricted to the use of the minister and organist, unless the latter's instrument is also placed in the choir gallery.

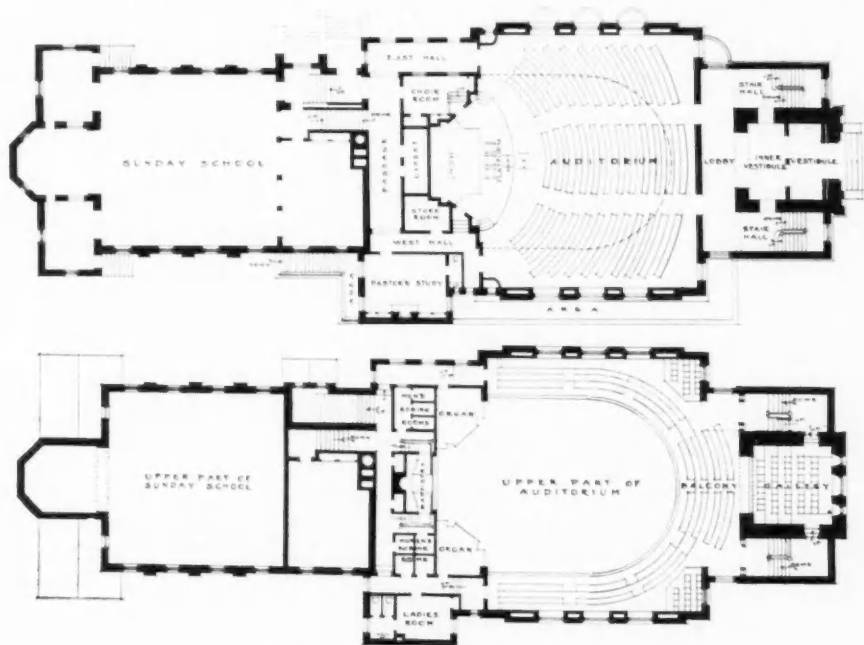


FIG. 26. EAST END BAPTIST CHURCH.
Hubbell & Benes, Architects.

gregation on the platform at certain times. (Figs. 6, 7, 8, 15, 24, 26.) If there is a large choir, increased space at one side or behind the platform is allotted to it, especially to facilitate rehearsals and to provide robing space; a separate entrance to the building for the minister, the choir and other participants in the service may also appear in the plan (Figs. 28, 30). At the back or side of the platform, or above it, a gallery may be built for the choir—denominational faiths usually desire the presence of the choir near the platform or chancel; ritual faiths are frequently content to place the

The placing of the organ itself is of the utmost significance for the success of the service and may measurably control certain phases of the plan, especially in small churches, because of the space necessary for the organ chamber and for the proper diffusion of sound to the congregation. These conditions are all more feasibly met in the liturgic church with its ample chancel space. (Fig. 31).

There remain also to be included the baptistery, if this is to be granted a separate room or plan subdivision, the sacristies in the case of the ritual church (Fig. 22), robing rooms as in the case

of a Baptist church (Figs. 11, 15, 18), as well as other similar denominations to meet the specific needs of individual forms of worship, and finally a committee meeting room, although this requirement is often met by the pastor's study. Space would also need to be assigned for the storage of utensils, books and music, and for retiring rooms. The two last named groups may be placed in a cellar where also the heating plant would be located. Although the sacristy and dressing rooms

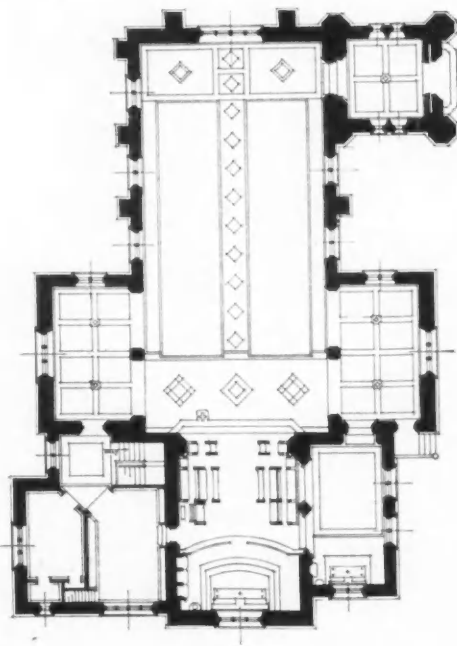


FIG. 27. ST. CORNELIUS' CHAPEL, GOVERNOR'S ISLAND, N. Y.
Charles C. Haight, Architect.

should be placed near the chancel or platform, the other rooms may be disposed as space becomes available in the plan elsewhere in the building (Figs. 6, 11).

Thus far our conditions have been in general those of the interior arrangement of the earlier churches magnified to much greater proportions, but not markedly altered in the service of the various parts. Furthermore, we have dealt with service requirements which may be individually met, if necessary, by interior subdivisions, and which may be readily accom-

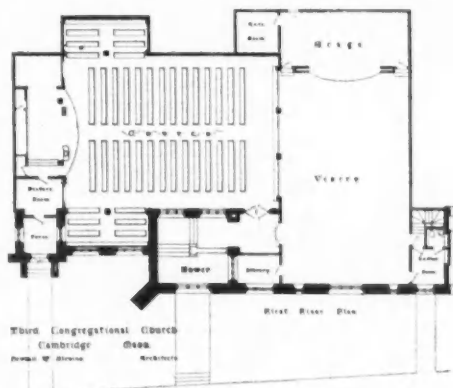


FIG. 28. THIRD CONGREGATIONAL CHURCH, CAMBRIDGE, MASS.
Newhall & Blevins, Architects.

modated upon a single level or floor, with the exception of the choir gallery, which also may be regarded as an interior modification only, not necessarily operating to effect a plan alteration.

A more detailed study of the audience hall development must be held in abeyance until the matter of the Sunday School treatment is considered, since many of the later advances in church planning have been definitely controlled by the latter requirement in its integral relation to audience hall and its combina-

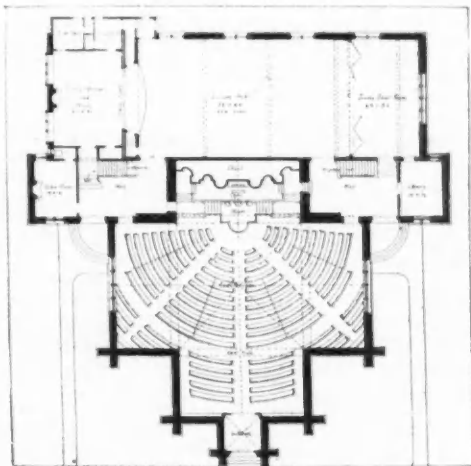


FIG. 29. PROPOSED UNITARIAN CHURCH, SOMERVILLE, MASS. TOWER APPEARS OVER ENTIRE CROSSING OF TWO ARMS OF GREEK CROSS.
Cram, Wentworth & Goodhue, Architects.

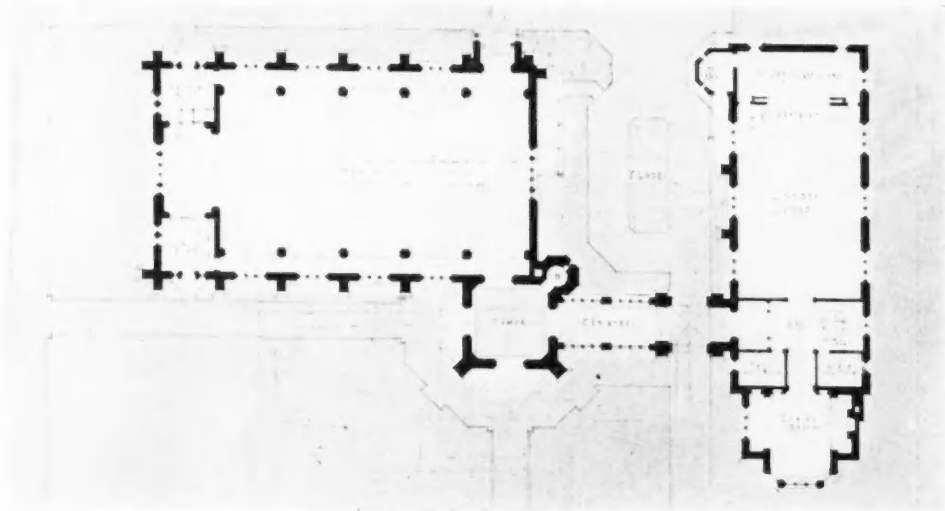


FIG. 30. SECOND CONGREGATIONAL CHURCH, LYNN, MASS.
Nelson & Van Wagenen and George H. Breed, Associate Architects.

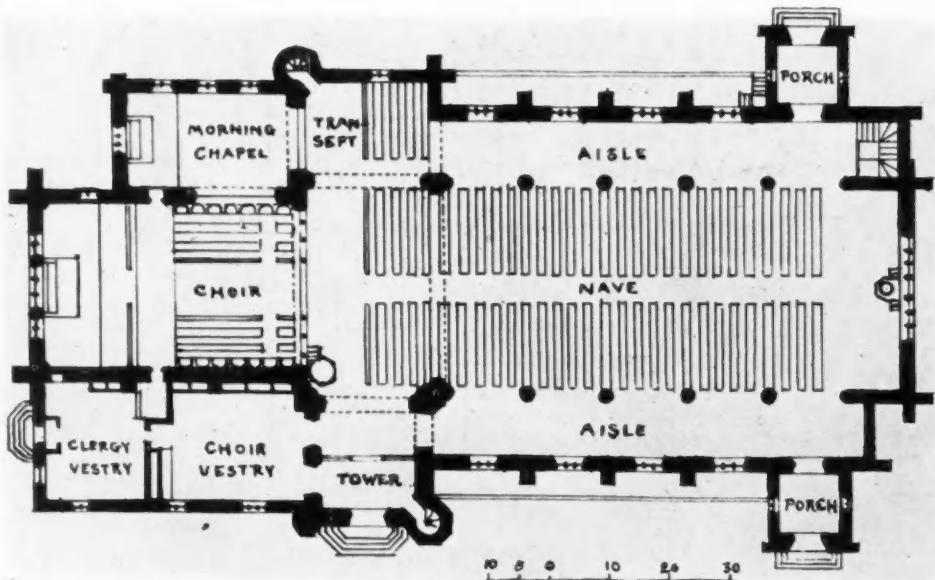


FIG. 31. CHRIST CHURCH, NEW HAVEN, CONN.
Henry Vaughan, Architect.

tion therewith under a single roof and upon first one then two or even three different levels.

In the plans illustrated it should be borne in mind that no indication whatever is made of the actual design of the buildings illustrated. Although decidedly germane to the general subject of church planning, it has not been considered essential to our present restricted study of plan development. Possibly a

later series of papers will be devoted to a separate treatment of this phase of American church growth.

Our next feature, that of the plan response to the requirements of the Sunday School, involves an important addition, frequently a fabric transformation of the entire structure. For purposes of comparison and as a foretaste of this development a few of these plans are included in the present paper.

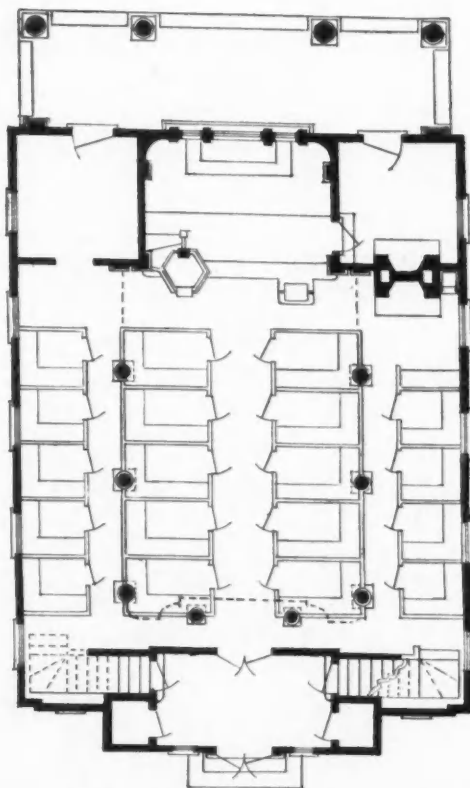
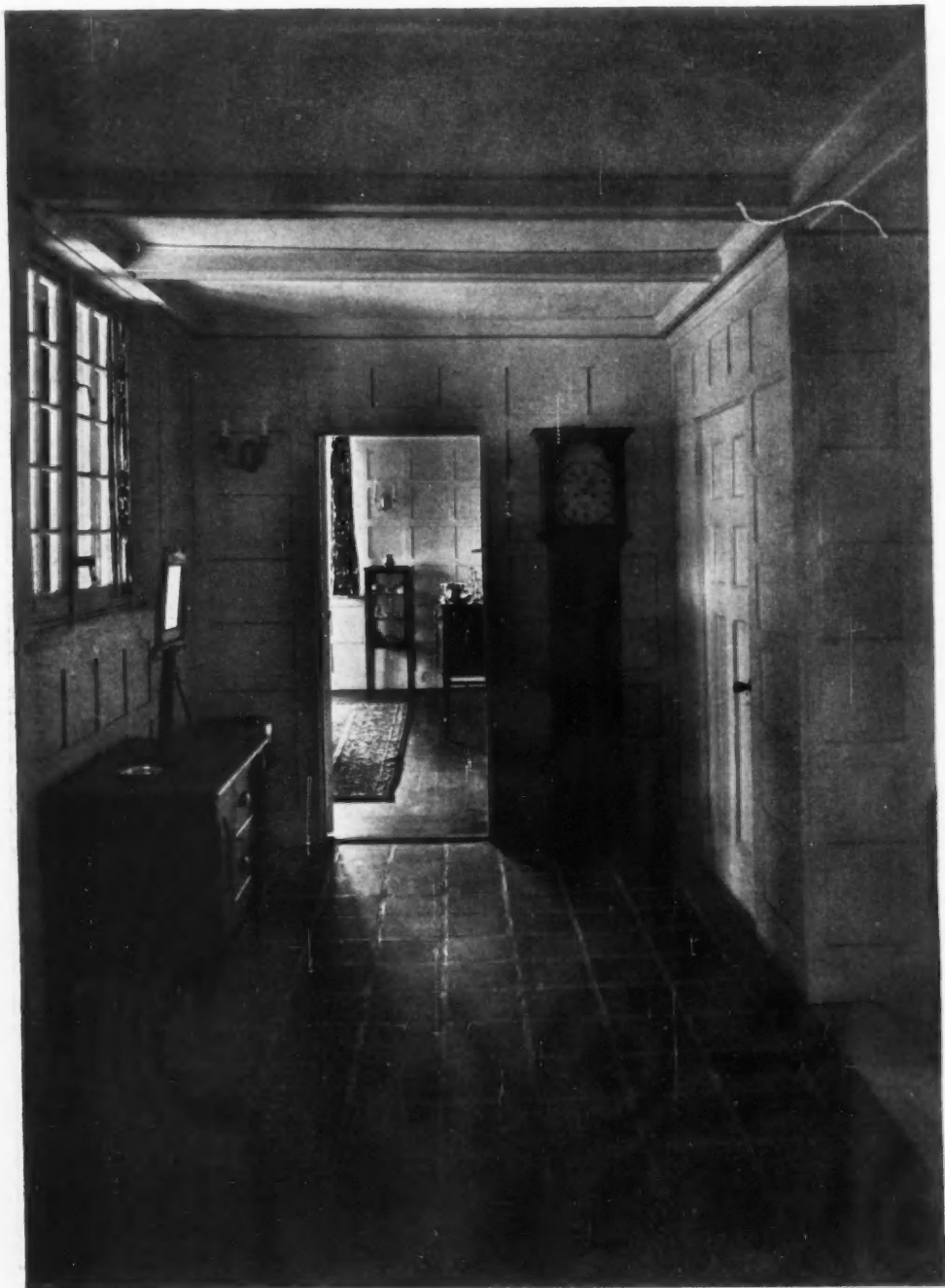


FIG. 32. ALL SOULS IN-THE-EAST, SUMMIT, N. J.
MODERN MEETING HOUSE INTENTIONALLY
APPROXIMATING PROTOTYPE.
Joy Wheeler Dow, Architect.

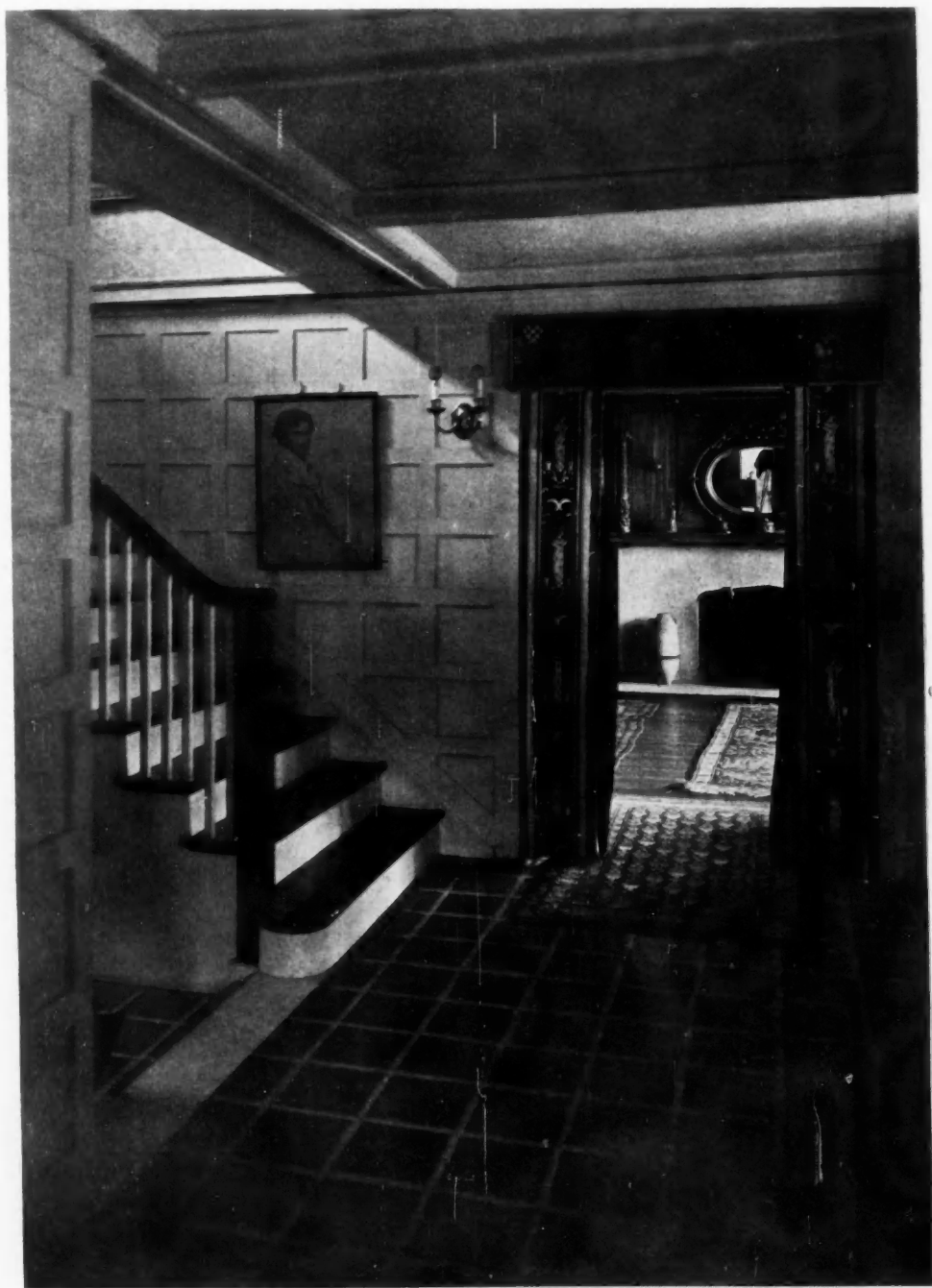
PORTFOLIO
OF
CURRENT
ARCHITECTURE



✓ LIVING ROOM—HOUSE OF FREDERICK DANA MARSH, ESQ., WYKAGYL PARK, NEW ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



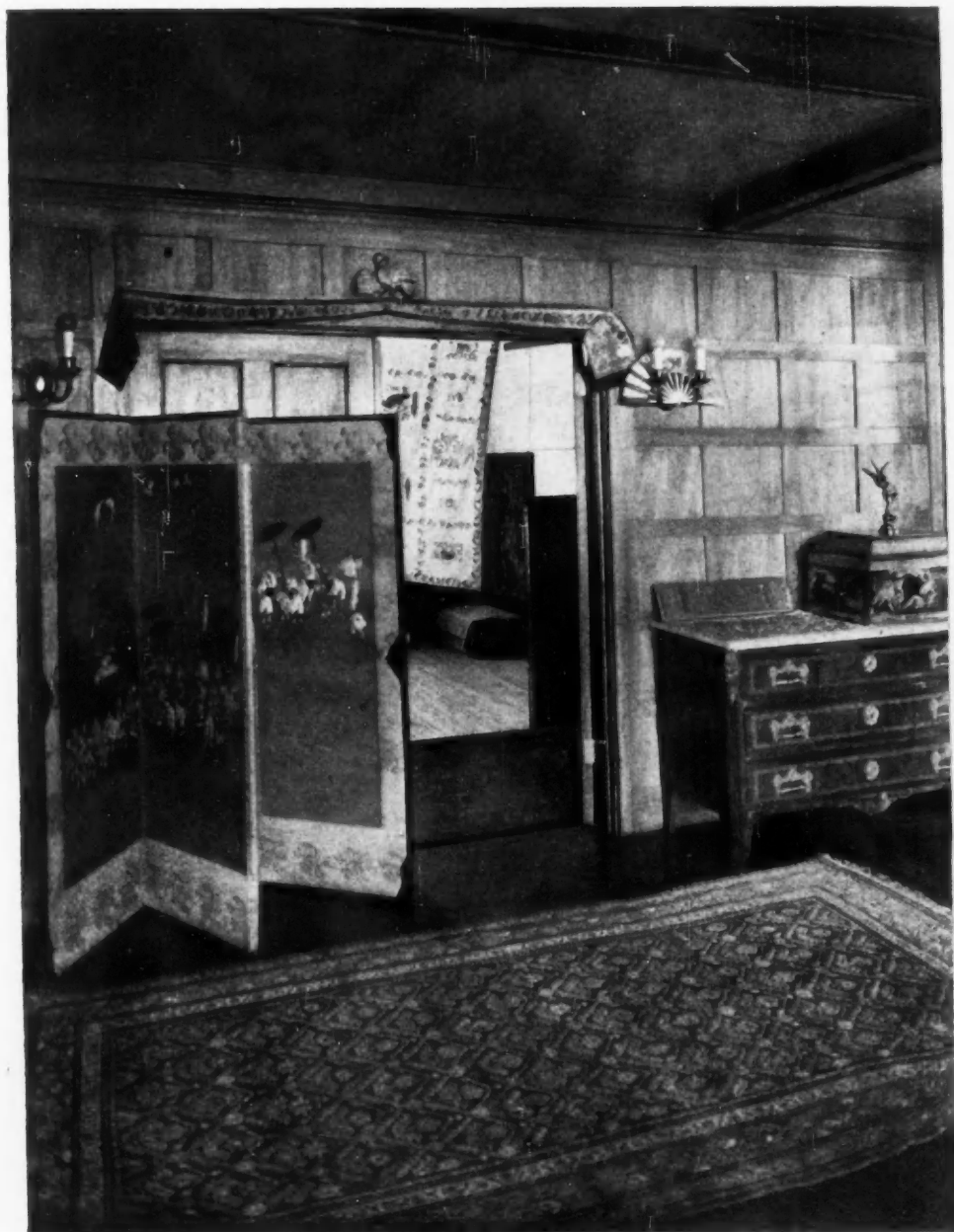
HALLWAY—HOUSE OF FREDERICK DANA
MARSH, ESQ., WYKAGYL PARK, NEW
ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



HALLWAY—HOUSE OF FREDERICK DANA
MARSH, ESQ., WYKAGYL PARK, NEW
ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



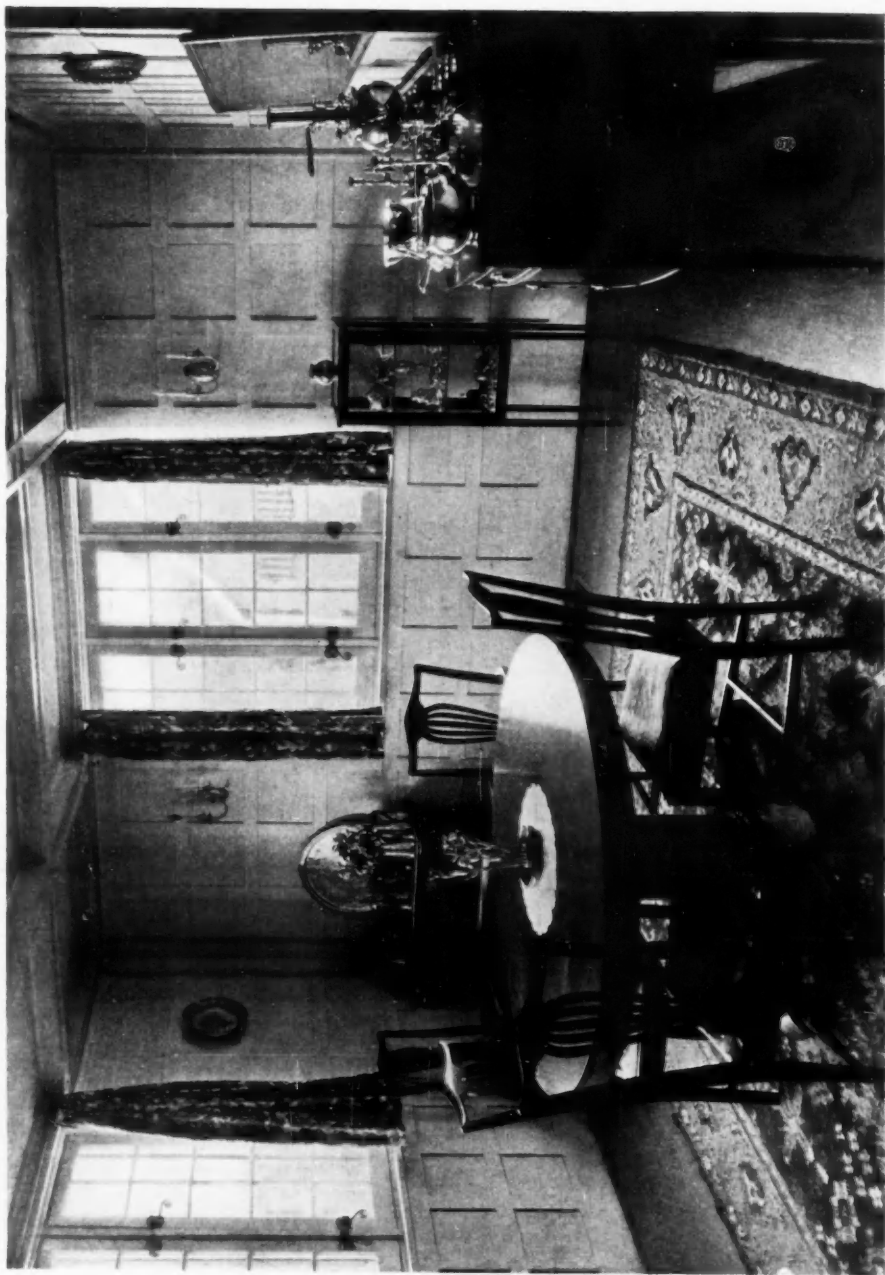
LIVING ROOM—HOUSE OF FREDERICK DANA
MARSH, ESQ., WYKAGYL PARK, NEW
ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



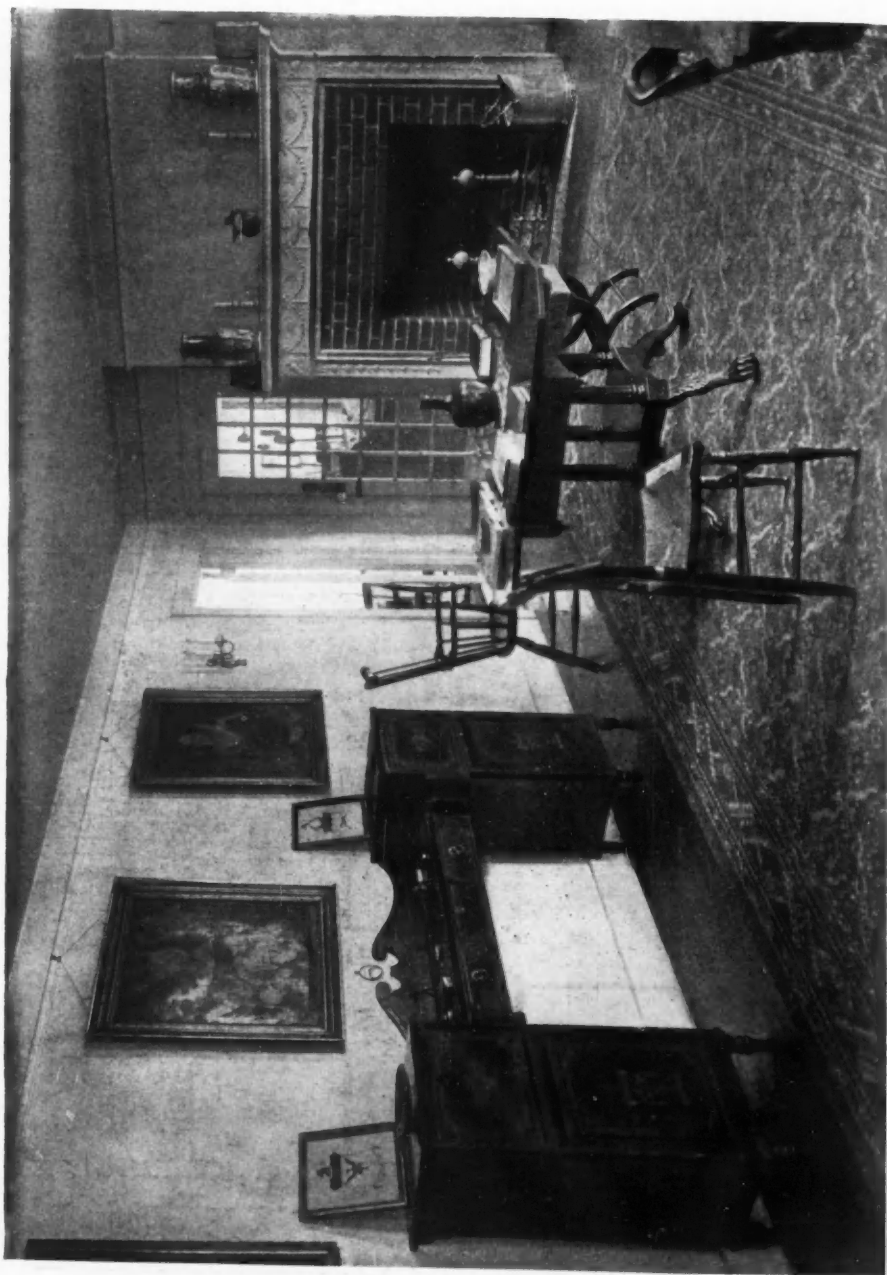
LOOKING INTO STUDIO—HOUSE OF FREDERICK
DANA MARSH, ESQ., WYKAGYL PARK, NEW
ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



LIVING ROOM—OWN HOUSE, WYKAGYL PARK,
NEW ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



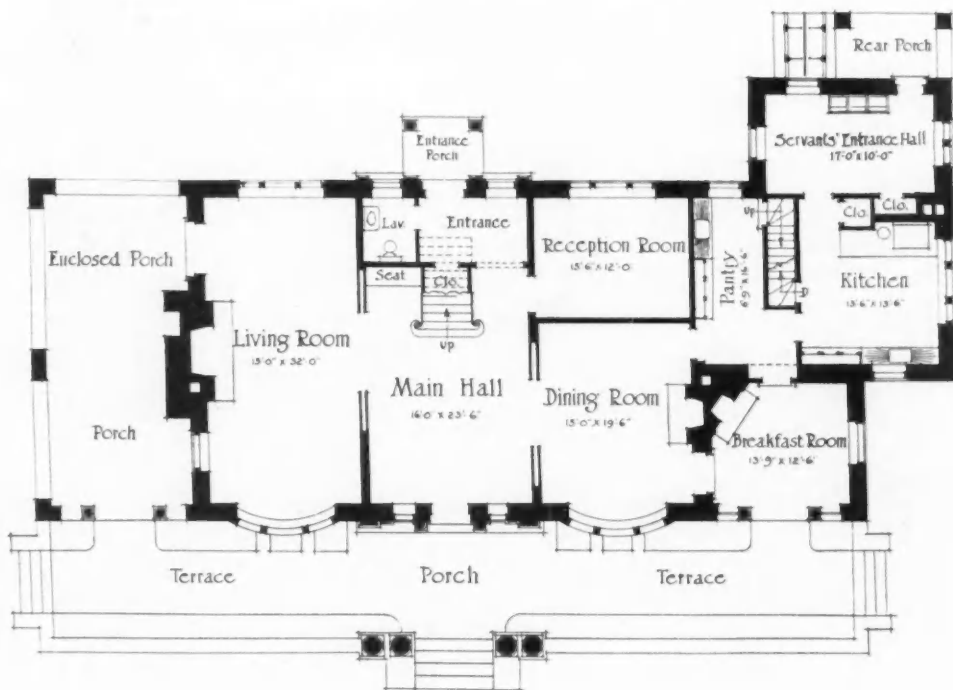
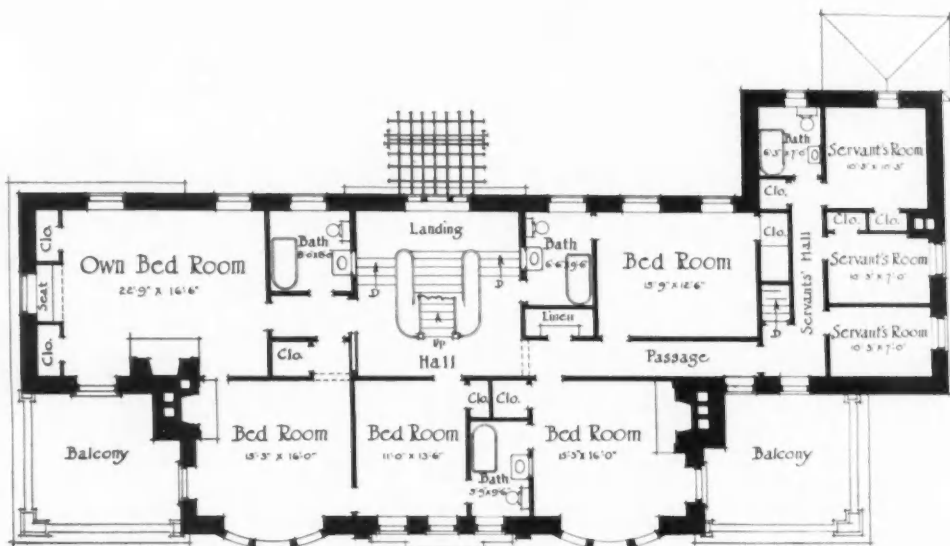
DINING ROOM—HOUSE OF FREDERICK DANA
MARSH, ESQ., WYKAGYL PARK, NEW
ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



LIVING ROOM—OWN HOUSE, WYKAGYL PARK,
NEW ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



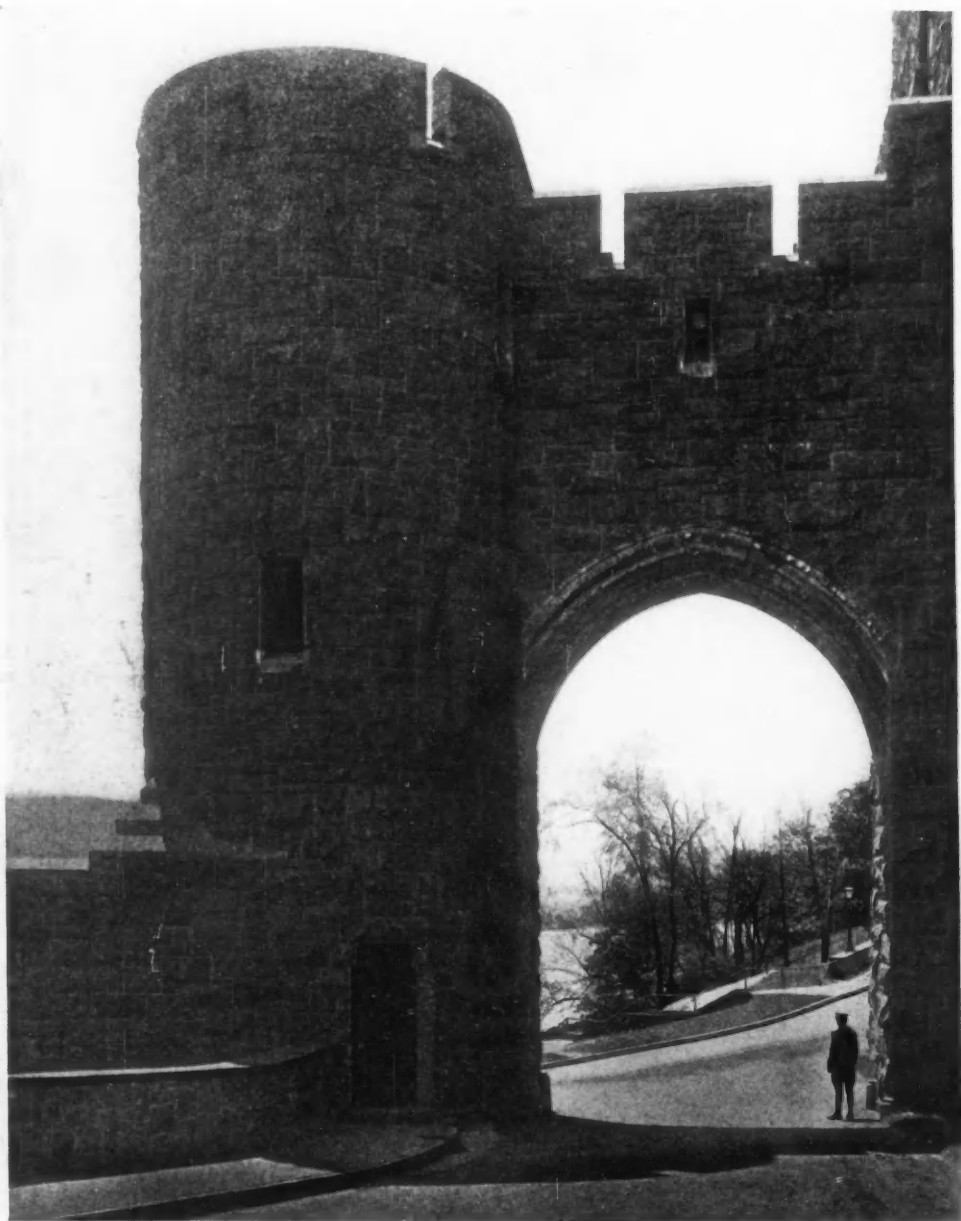
LIVING ROOM—OWN HOUSE, WYKAGYL PARK,
NEW ROCHELLE, N. Y. H. G. MORSE, ARCHITECT.



FIRST AND SECOND FLOOR PLANS—HOUSE AT HAVERTOWN, PA. D. KNICKERBACKER BOYD, ARCHITECT.



HOUSE AT HAVERFORD, PA. D.
KNICKERBACKER BOYD, ARCHITECT.



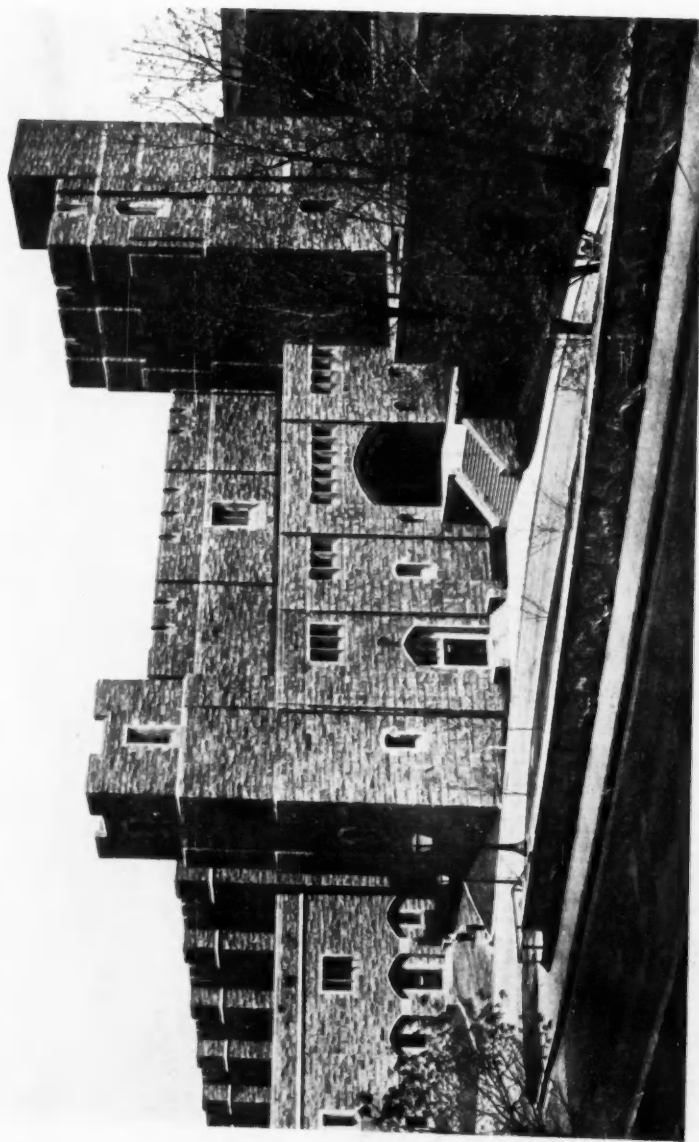
PORTCULLIS, POST HEADQUARTERS, U. S.
MILITARY ACADEMY, WEST POINT, N. Y.
CRAM, GOODHUE & FERGUSON, ARCHITECTS.



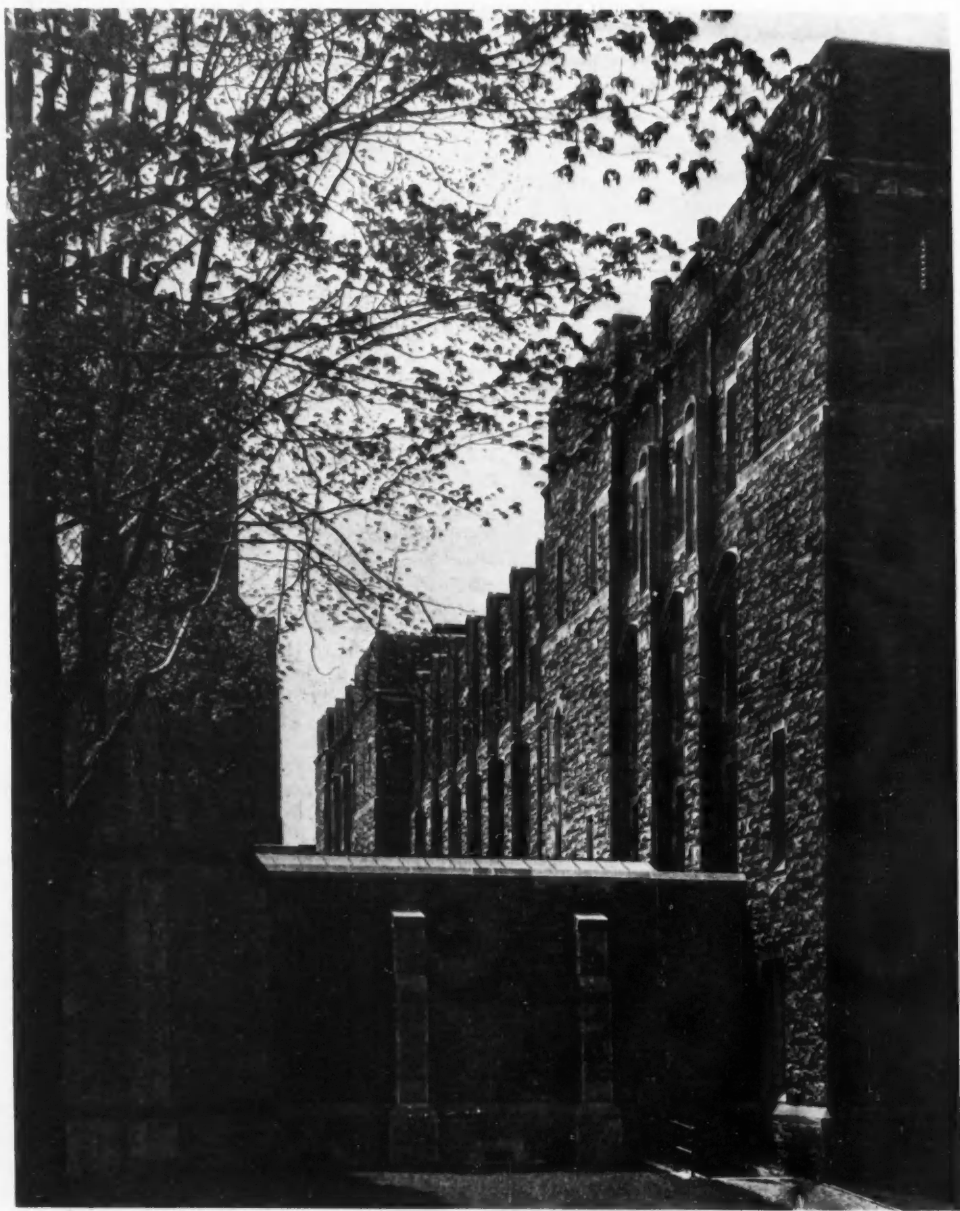
POST HEADQUARTERS, U. S. MILITARY
ACADEMY, WEST POINT, N. Y. CRAM,
GOODHUE & FERGUSON, ARCHITECTS.



RIDING HALL, U. S. MILITARY ACADEMY, WEST POINT, N. Y. CRAM, GOODHUE & FERGUSON, ARCHITECTS.



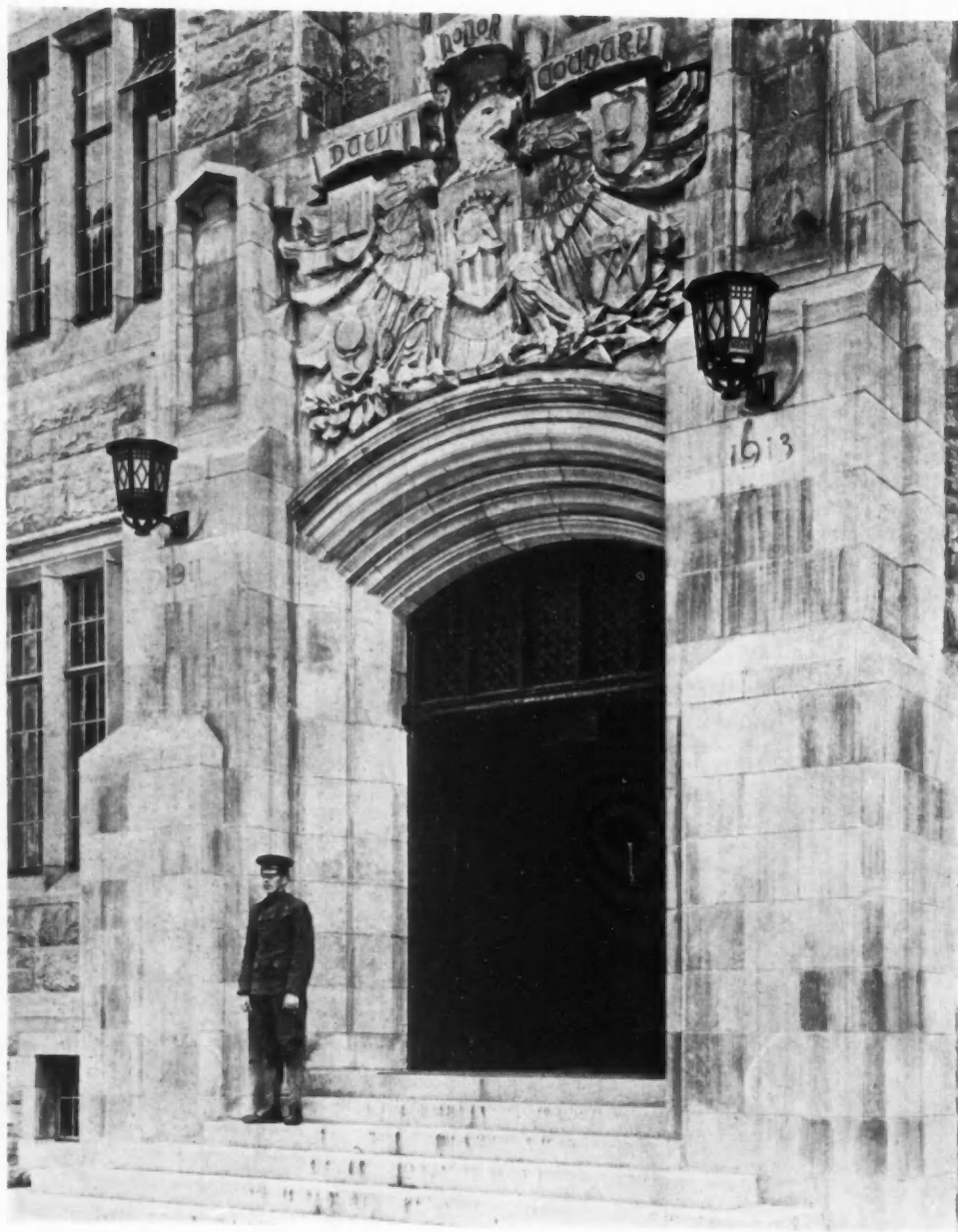
RIDING HALL, U. S. MILITARY ACADEMY, WEST POINT, N. Y. CRAM, GOODHUE & FERGUSON, ARCHITECTS.



EAST ACADEMIC BUILDING, U. S. MILITARY ACADEMY, WEST POINT, N. Y.
CRAM, GOODHUE & FERGUSON, ARCHITECTS.



RIDING HALL AND POST HEADQUARTERS, U. S.
MILITARY ACADEMY, WEST POINT, N. Y.
CRAM, GOODHUE & FERGUSON, ARCHITECTS.



ENTRANCE TO EAST ACADEMIC BUILDING,
U. S. MILITARY ACADEMY, WEST POINT, N. Y.
CRAM, GOODHUE & FERGUSON, ARCHITECTS.



EAST ACADEMIC BUILDING, U. S. MIL-
ITARY ACADEMY, WEST POINT, N. Y.
CRAM, GOODHUE & FERGUSON, ARCHITECTS,



GENERAL VIEW—U. S. MILITARY
ACADEMY, WEST POINT, N. Y.

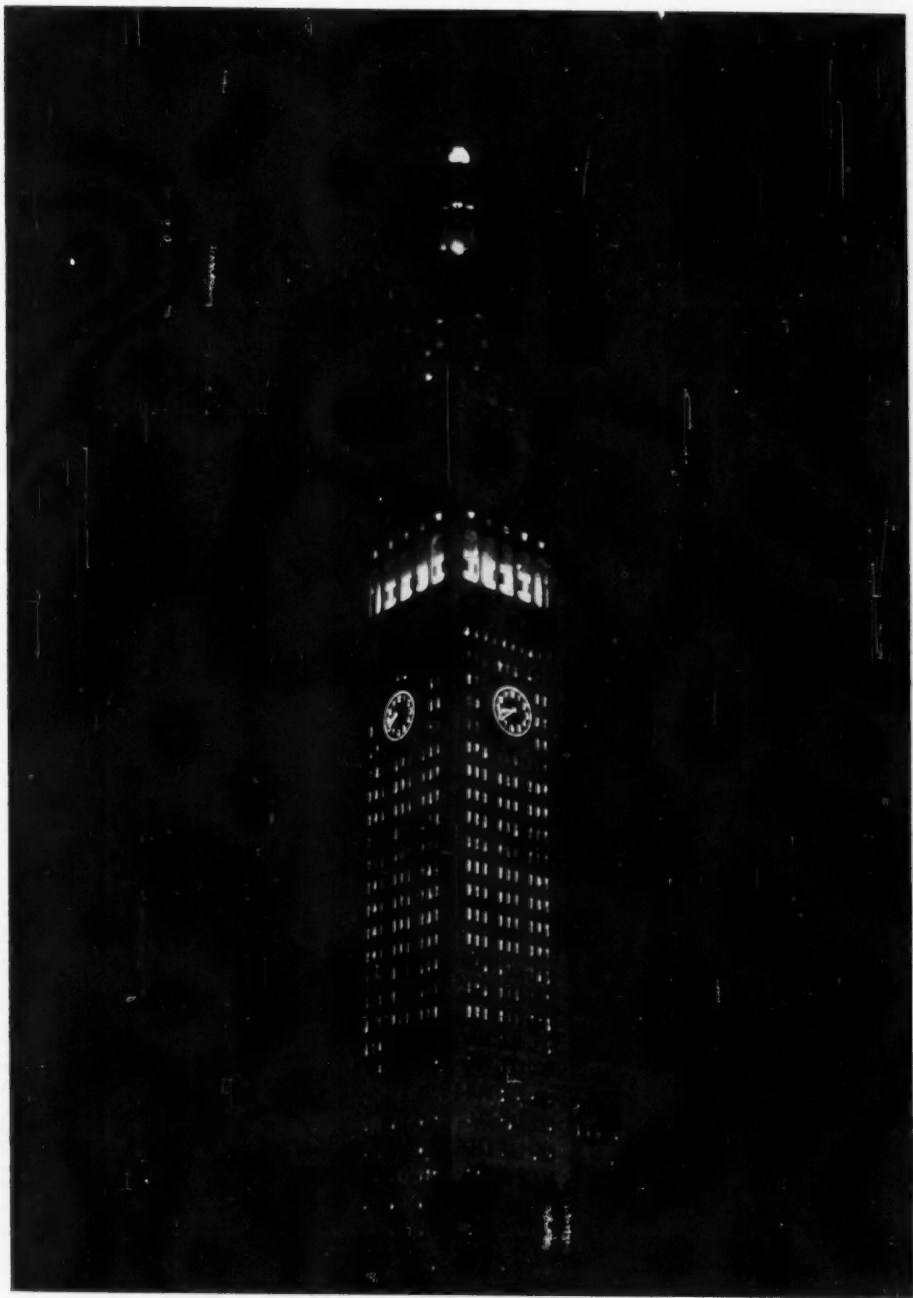


Photo by Vander Weyde.

THE METROPOLITAN TOWER, NEW YORK.



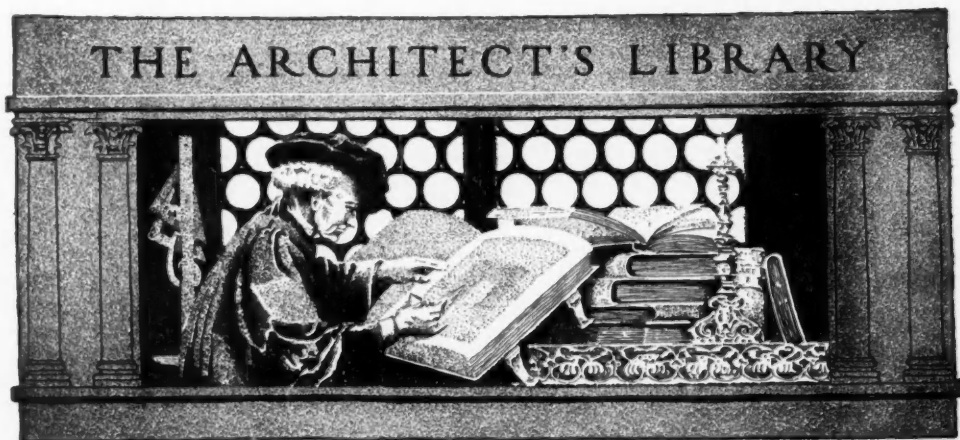
Photo by Vander Weyde.

VIEW FROM METROPOLITAN TOWER, LOOKING SOUTH.



Photo by Vander Weyde.

MADISON SQUARE, NEW YORK.



BOOKS ON COLONIAL ARCHITECTURE

By RICHARD FRANZ BACH

Curator, School of Architecture, Columbia University

Part III.—Dwellings (Continued)

IMEDIATELY when we undertake the study of published works on Colonial architecture as evidenced by individual cities, we are confronted with the considerable problem, so often met before of weeding out of the mass of purely local historical and largely genealogical material the few architecturally interesting books. The quantity of well meaning small town histories produced in the coast states is sometimes amazing and the consistency with which all accurate description of buildings and their construction is shunned is even more notable.

Many of these books—of which the majority are interminably prolix—must be of great value in fields of research other than that at present under survey, and not a few contain data of notable interest to the historian of architecture, especially those which give rescripts of correspondence concerning prospective building operations, prices of labor, relative qualities of materials for given purposes, and the like. Few, however, offer anything more than dates and other equally unimaginative facts in regard to the buildings in their respective districts. Thus we come

upon a number of thoroughly sermon-like volumes such as *The Secular and Ecclesiastical History of the Town of Worthington* (Albany; Weed, Parsons and Company; 1853), which has much to say of ministers but nothing of the church edifice, or the more long winded yet quite readable book by Charles W. Brewster entitled *Rambles About Portsmouth, Sketches of Persons, Localities and Incidents of Two Centuries, Principally from Tradition and Unpublished Documents* (Portsmouth, N. H.; Lewis W. Brewster, publ.; 1873), and possibly also the same author's *Rambles About Boston*, also well written; or the seemingly misnamed *Ancient Landmarks of Plymouth* by William T. Davis (Boston; Damrell and Upham; 1899), which deals not at all with landmarks in the architectural sense; or the occasional county volume such as *Drake's Historic Fields and Mansions of Middlesex*; or the more recent type of talkative volume, such as *Old Concord, Her Highways and Byways*, by Margaret Sidney (Boston; Lothrop, Lee and Shepard; 1892). Works of this type are often thoroughly well written, but can offer no notable contribution to our present quest.

We find better gleaning in books devoting greater attention to the architectural equipment of the various local centres, such as for example Francis Atwater's *History of the Town of Plymouth, Connecticut* (Meriden, Conn.; Journal Publ. Company; 1895), or Mary E. Perkins' *Old Houses of the Antient (sic) Town of Norwich, 1660-1800* (Large octavo; pp. xviii+621. Maps, illustrations, portraits, genealogies. Norwich, Conn.; publ. by the author; 1895), or better yet in those following more closely what may be called the guide book manner, such as *Rambles in Old Boston, New England*, by Edward G. Porter, with illustrations by George R. Tolman, (Large octavo; pp. xviii+437, 1 map and numerous ill., Boston; Cupples and Hurd; 1887. \$6.—), who also issued a separate volume of *Twelve Sketches of Old Boston* (Boston; privately printed; 1882. No longer available), which shows praiseworthy skill; or George B. Bartlett's *Concord: Historic, Literary, and Picturesque* (Duodecimo; pp. 200, ill., Boston; Lothrop, Lee and Shepard; 1895. \$1.—); or finally, *Old Concord*, by Allen French, with good drawings by Lester G. Hornby (Octavo; xii+186, ill. Boston; Little, Brown and Company; 1915. \$3.—).

Latterly a few books, more decidedly useful from our present viewpoint, have been issued, but in all cases measured drawings have been sadly lacking, although photographs have shown good quality. In the latter field we might note Frank Cousins' *Colonial Architecture; Fifty Salem Doorways*, which was published as series 1 of a continued work, and was provided with an introduction by Glenn Brown, but unfortunately has never achieved its second series. It is a folio work of fifty plates, without text, but with brief descriptive paragraphs for each subject, admirably photographed and as well reproduced. (Garden City, L. I.; Doubleday, Page and Co.; 1912. \$5—). The Salem field has also been well covered in a brochure entitled *Selected Interiors of Old Houses in Salem and Vicinity*. This is edited and published with the purpose "of furthering a wider knowledge of the beautiful forms of domestic architecture developed during

the time of the Colonies and the early days of the Republic." The pamphlet, which is of small quarto size and contains 55 well illustrated pages, bears the half title: The Monograph Series on Subjects Pertaining to Architecture and Allied Interests (Boston; Rogers and Manson Company; 1916. \$1.—). There is no promise held forth, however, that the series will contain monographs on subjects chosen in the Colonial field exclusively. Other districts have been treated in Albert Hale's compilation of *Old Newburyport Houses* (Quarto; pp. 4+64 plates. Boston; W. B. Clarke and Company; 1912. \$2.50) and in Arthur L. Brandegee and Eddy N. Smith's *Farmington, Connecticut, the Village of Beautiful Homes* (Square folio; pp. 213, ill. Farmington, Conn., publ. by the authors; 1906, \$3.50) and likewise in *The Portsmouth Book*, which contains as one of twelve chapters a section by R. Clipston Sturgis with the title "The Architecture of Portsmouth." (Quarto, pp. xxx, ill. Boston; Ellis. 1912. No longer available.) The last named is an evidence of a type of community advertising scheme, which has elsewhere taken the form of pageants and watchwords, such as "boom Tacoma," and which might bear repetition in other civic enterprises if the same quality in the result may be guaranteed. In the *Homes of Our Forefathers* series by E. Whitefield, mentioned in preceding paragraphs, also appeared a volume entitled *Boston, Old England and Boston, New England* (Large octavo; pp. 84+64 unnumbered plates. Boston; Damrell and Upham; 1889. No longer available), which is the exact counterpart of any one of its predecessors by the same author, and therefore merits no further description here.

Before closing the discussion of books concerning the New England district a record of good quality must be registered in behalf of a new volume which has just reached our table; this is the work of Joseph Stowe Seabury and is entitled *New Homes Under Old Roofs* (Quarto; pp. 23+36 plates. New York; Frederick A. Stokes Company; 1916. \$3.50). In reviewing a recent work by

Mary Harrod Northend, *Remodelled Farm Houses*, we noted the omission of views that would convey to the lay mind, that is, without too great an effort at visualization,—which only the practitioner in the building field may be required to master with any degree of facility,—a comparison of the old state of the structure which formed the basis of the process of rehabilitation. This defect is overcome in Mr. Seabury's book in very attractive fashion. The author has himself had a hand in numerous restorations, or rather, remodelings, and has fortunately realized the value of recording an optical comparison of old and new, both to show the possibilities of adaptation and the resourcefulness of Colonial design. There are many among us who are of the assurance that a recrudescence of Colonial architecture in its simpler types is gradually gaining in influence in the popular mind and that, once recognized as a stylistic expression which has never been entirely lost and needs only to be granted a modicum of attention and interpretation, it will displace the majority of style varieties in domestic architecture in the New England and Middle States. Work like that of Mr. Seabury bears witness to this conviction on the part of a goodly number of architects and also the growing hold which the homeliness of Colonial building art has gained in the interests of lay home builders of to-day. In the present work are gathered together no less than thirty-six examples of remodeled buildings—perhaps rehabilitated would be a better term, because so many had up to recent years been considered "deserted farmhouses"—all illustrating the extent to which the process of redistribution of old forms may be carried without serious detriment to the original character of the house and with the accrued advantages of modern convenience, comfort and utility. The results are in some cases little short of remarkable, when the former state of decrepitude is considered and when, furthermore, it is borne in mind that practically none of the old houses were permitted to endure through two centuries or more in their pristine simplicity of design, but were frequently afflicted with

misguided attempts at what has been misnamed beautification or at any rate with the flagrant results of abortive suggestions of modernity in the form of changes in roof lines, gable additions, altered entrance motives, and the like. By bringing face to face the old and the new forms,—the photographs are all taken from nearly identical angles of vision,—the author has brought home the possibilities inherent in old buildings.

Our brief survey has clearly demonstrated, no doubt, that in the exploitation of Colonial architecture in present state areas there is a decided paucity of material; that in the field of the restricted municipal centres and their immediately adjacent areas of influence there is more available material, but that this lacks thorough study and is constituted chiefly of superficial text volumes or of collections of photographs; and that in the end the student and reader must refer to broader works covering the whole New England district as sources of his information or else, finally, must bring himself to rely upon the isolated plates from a given locality in the old Colonial territory which he may find in the larger works, among which *The Georgian Period* and similar publications are thus far the best. We may be pardoned if we venture again to lay emphasis upon this easily remedied deficiency in the literature of our early building time. There is much to be done in this field; it is rich in benefits. Incidentally, it is fast being depleted; the profitable monuments grow less daily. We look forward to the inspiring moment when the full realization of the architectural value of our heritage shall have firmly gripped the attention and the co-operative interest of architects and allied laymen, when extant monuments shall have been measured and drawn until all the best are recorded for the future, when others not so good shall at least have been photographed for record, when many of sterling worth shall have been restored to their pristine condition to serve as informative models of a style that has never run its full course.

Our next paper will concern the literature of Colonial architecture in the Middle Colonies and early States.

A BIBLIOGRAPHY OF THE LITERATURE OF COLONIAL ARCHITECTURE.

III. Works Concerning Domestic Architecture in the New England States.

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Little, Arthur. *Early New England Interiors*. Sketches in Salem, Marblehead, Portsmouth and Kittery. Long quarto; no text, 36 unnumbered plates. Boston; A. Williams & Company; 1878. Rare.

Northend, Mary Harrod. *Historic Homes of New England*, with numerous illustrations. Royal octavo; pp. xvi+274, ill.+95 plates; index. Boston; Little, Brown & Company; 1914. \$5.

Northend, Mary Harrod. *Remodelled Farmhouses*, with numerous illustrations. Royal octavo; pp. xiv+264, ill., index. Boston; Little, Brown & Company; 1915. \$5.

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Perkins, Mary E. *Old Houses of the Antient (sic) Town of Norwich, 1660-1800*. With maps, illustrations, portraits and genealogies. Octavo; pp. xviii+621, ill. Norwich, Conn.; publ. by the Author; 1895. \$4.

Porter, Edward G. *Rambles in Old Boston, New England*. Large octavo; pp. xviii+437, ill. by George R. Tolman. Boston; Cupples & Hurd; 1887. \$6.

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**Some Good
Examples
of Interior
Decoration.**

In the illustrations of the interiors of the houses of H. G. Morse, Esq., and Frederick Dana Marsh, Esq., at Wykagyl Park, New Rochelle, published in the Portfolio of this issue, there are one or two features towards which it is worth while to direct attention. The interiors in both houses are simple and unpretentious, but possess a degree of dignity and interest whose cause deserves some analysis. In the case of Mr. Morse's living-room, the room is made, so far as the furniture is concerned, by the exceptionally fine old Sheraton sideboard. The other pieces in the room, though decidedly good in their several styles, are all subsidiary to this one piece, which centres interest and is the only object of any moment on the long, unbroken side of the room. In scale and proportions the sideboard accords with the dimensions of the room itself and of the wall space back of it, and its suitability, therefore, gains emphasis. The somewhat unusual, though legitimate, use to which this piece of furniture is put as a part of living-room equipment should be noted. The secret of charm in the present case lies, first, in allowing one or two pieces of exceptional merit to dominate a room, and, second, in the freedom from the crowding interference of unimportant things.

With reference to Mr. Marsh's house, practically the same thing is to be said. The occupants are obviously not afraid of what a good many people would look upon as emptiness. Under such conditions, a few really good pieces have a chance to be seen to advantage and produce the full effect of which they are capable. The ingenious method of decorating an ugly Victrola case and incorporating it within a part of the book shelving in the living-room should not be overlooked.

**Notes on
Early
Mosaic
Work.**

The art of mosaic is supposed to have had its origin in Asia, where paintings of this kind were composed in imitation of the beautiful carpets which were manufactured at all periods in those countries. The Egyptians probably employed mosaic work for various purposes, but no traces of it have been found in the ruined temples or palaces. It is believed that the only specimen of Egyptian mosaic is now in the Egyptian collection at Turin. It consists of a number of small paintings executed on a mummy case. The material is enamel, and the colors, representing faithfully the plumage of birds, are of different hues.

In Greece the mosaic art, after the time of Alexander, assumed an importance which entitled it to be ranked as an independent art. By skilful management of the colors and by giving to the figures an exquisite harmony, the artists succeeded in causing their work at a slight distance to resemble real paintings. Different names were assigned to these mosaics according to the size of the pieces of marble employed. When small cubes were used, the mosaic was called "opus tessellatum" or "vermiculatum."

Pavements, ceilings and walls were often adorned by the Greeks with mosaics. Marble was the material most frequently used. A bed of mortar was first prepared and this was covered with a very fine cement. The artist having before him the colored design which he was to execute, fixed the colored cubes in the cement and polished the entire surface, when it had hardened, taking care, however, that too great a polish was not given it, since by its strong reflection the general effect of the work might be marred.

One of the principal advantages of mosaic, from a practical point of view, is that

it resists humidity and all other influences which would be likely to change the color and the beauty of a real painting.

One of the choicest examples of the Greek mosaic is found in Hadrian's Villa. It represents, as our first illustration shows, a vase full of water, on the sides of which are four doves, one of which is drinking. Some suppose it to be the mosaic of Pergamus mentioned by Pliny. It is composed entirely of cubes of marble, without any admixture of colored glass.

Mosaic of this kind may be regarded as representing the most ancient type. It was only gradually that the art of coloring marble, enamel and glass multiplied the materials suited for mosaics, rendering their execution much easier. When the process had thus been developed, the mosaic art was carried to a very high degree of perfection.

Perhaps the most beautiful specimen of old mosaic work that has been discovered is one which probably depicts the battle of Issus. The Grecian leader, supposed to represent Alexander the Great, is portrayed with great beauty and vigor. Charging, bareheaded, in the midst of the fight, he has transfixed with his lance one of the Persian leaders, whose horse, wounded in the shoulders, had already fallen. In the background the Persian spears are directed against the advancing Greeks. This specimen, which was discovered in the House of the Faun, is now preserved in the museum at Naples.

In the early days of Greece painted floors were much used, but they were later driven out by the mosaic floors (Lithostrata), a specimen of which is here shown. The



EARLY MOSAIC—A VASE WITH DOVES.

most famous workman in this style was Sosos, who wrought at Pergamus the pavement called *Asarotus oikos*, or "unswept hall," made of square tesserae of different colors in such a way as to resemble crumbs and scraps that had fallen from the table and had been allowed to remain through neglect.

The first paved floors that came into use were known as *barbarica* and *subtegulanea*, which were beaten down with rammers. Those called *scalpturata* were first introduced into Italy in the temple of Jupiter Capitolinus after the beginning of the third Punic war.

The Greeks applied these floors to galleries and terraces open to the sky. "To make such a terrace," writes an ancient authority, "it is necessary to lay two courses of boards, one athwart the other, the ends of which ought to be nailed, that they should not twist nor warp; which done, take two parts of new rubbish and one of tiles stamped to powder; then with other three parts of old rubbish mix two parts of lime, and herewith lay a bed of a foot thickness, taking care to ram it hard together. Over this must be laid a bed of mortar, six fingers thick, and upon this middle couch, large paving-tiles, at least two fingers deep. This sort of pavement is to be made to rise to the centre in the proportion of an inch and a half to ten feet. Being thus laid, it is to be planed and polished diligently with some hard stone; but, above all, regard is to be had that the boarded floor be made of oak. Moreover, it were better to lay a course of flint or chaff between it and the lime, to the end that the lime may not have so much force to hurt the board underneath it. It were also well to put at the bottom a bed of round pebbles."



AN EARLY MOSAIC FLOOR.

Another kind of pavement was known as Graecanica. The process of its preparation is thus described: "Upon a floor well beaten with rammers is laid a bed of rubbish or broken tile-shards, and then upon it a couch of charcoal, well beaten and driven close together, with sand and lime and small cinders, well mixed together, to the thickness of half a foot, well leveled; and this has the appearance of an earthen floor; but if it be polished with a hard smooth stone, the whole pavement will all seem black."

R. I. GEARE.

**"The
Clock
on the
Green."**

An interesting account of the origin of the Clock on the Green, at Waterbury, Conn., is given in the letter sent with the photograph by Mr. Chas. A. Colley, President of the Waterbury Chamber

of Commerce, from which the following is taken:

"I am sending you a picture of the clock with which all Waterbury is delighted, in spite of the spirited, long-continued opposition to it on the ground that the Green, a distinctive feature of the New England villages and larger towns, should be allowed to remain in pristine purity, unencumbered by such a modern feature as a public clock.

"After the destruction of our City Hall by fire, the clock which had hung on the tower was missed quite as much as the City Hall itself. People from habit persistently looked for the clock years after its destruction, but there was nothing but thin air to reward them.

"Thousands of people are daily at the trolley ways in sight of the Green and other thousands walk through it by day and by night, and they have come to rely upon the accuracy of the clock, as it is never out more than a half minute a month.

"The first contribution toward this clock was the sum of one hundred and fifty dollars, proceeds from a play produced at one of our leading theatres in 1914. After that dull times came on and the project languished. With the return of prosperity the matter was again taken up and, with the co-operation of the Waterbury Republican, nearly a thousand dollars was raised. However, had it not been for the generosity of a public-spirited citizen, Mr. Truman S. Lewis, the clock would not now be real-



THE CLOCK ON THE GREEN, WATERBURY, CONN.

ized. Mr. Lewis gave twenty-five hundred dollars and then, impressed for the first time with the fact that the Green was in danger of 'desecration,' the storm of opposition broke loose, and for a time threatened to disturb the foundations of society.

"All opposition has now vanished and many who were strongly against the clock idea have been kind enough to say that they are already very fond of it and would not have it removed. It would have been easy, even after the money had been collected, to make a 'mess' of the whole thing through the selection of the wrong design. Fortunately we secured the services of Mr. Charles Lennox Wright, who favored the idea of a grandfather clock motif. Even then, except for the admirable way in which he carried out the clock for granite, the whole thing might have been a failure."

"From the ground to the face of the clock is about twenty-three feet; the upright part is four feet square; the bottom stone eight feet square; the one above six feet square—all in fine proportion from ground to finial."